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CAESAREAN SECTIONS AT THE HARTFORD HOSPITAL, 1904-1927

BY JAMES RAGLAN MILLER, M.D., F.A.C.S.*

TABLE NO. 1

MATERNITY SERVICE 1916-1926 INCLUSIVE

Mothers	16	17	18	19	20	21	22	23	24	25	26	Total
W.	473	445	348	309	303	232	255	342	370	439	470	3986
P.	512	581	537	661	676	562	626	772	784	846	907	7464
Total	985	1026	885	970	979	794	881	1114	1154	1285	1377	11,450
Priv. Rate	52%	56%	60%	68%	69%	70%	71%	69%	68%	65%	66%	65%
Deaths	10	7	14	6	6	1	4	4	2	4	5	63
Rate	1.01	.66	1.58	.62	.61	.12	.45	.35	.17	.31	.36	.55
Eclampsia	13	12	10	8	9	2	5	8	8	10	9	94
Pl. praevia	2	13	9	13	10	7	16	18	27	10	10	135
Forceps	68	69	86	94	90	76	91	116	147	157	165	1,159

MOST of the numerous reports of large series of caesarean sections which are to be found in current medical literature come from teaching hospitals or special maternity clinics where continuous service or supervision of one obstetrician assures a fairly consistent procedure. When one considers, however, the extent to which caesarean section is practiced by general surgeons and even general practitioners throughout the country, one sees the need of studying the results obtained in general open hospitals where such supervision is minimal or even entirely lacking. I have, therefore, no hesitation in presenting this analysis of 444 caesareans done at the Hartford Hospital between October 1, 1904 and September 30, 1927.

Hartford is a prosperous New England city, which increased from 110,356 inhabitants in 1916 to 164,228 in 1926, with a suburban population of about the same number. There is no striking racial group preponderance. During the past ten years there has been an increase in the negro population (estimated) from 3,000 to about 7,000 due to an influx of southern negroes who came to work in the Connecticut tobacco fields. This increase has made no noticeable difference in the puerperal mortality rate of the city.

The Hartford Hospital is a privately endowed general hospital. Its bed capacity increased from 304 in 1904 to 650 in 1927. During the early years no private patients were cared for, but in the last fifteen years their numbers have increased to something over 50% of the total. The ward patients are cared for by an appointed rotating staff. One may gain an idea of the maternity service by a study of table No. 1, which shows the last eleven years' activities, these being the only ones in which records are complete. Hospital privileges are enjoyed by all practicing physicians in good standing in the community with very few restrictions, and particularly in the maternity department many non-staff physicians from all Hartford county are in attendance on their private patients. The fiscal year of the hospital begins on October 1st.

*For record and address of author see "This Week's Issue," page 691.

TABLE NO. 2

TOTTENHAM'S FIGURES 1925

Hospital	Deliveries	Caesareans	Frequency
Jefferson Hospital, Philadelphia	362	55	1:6
Boston Lying-In	1,123	92	1:12
Bellevue, New York	4,286	44	1:97
New York Lying-In	3,511	5	1:585
Johns Hopkins	875	7	1:125
Johns Hopkins since opening			1:103
Swedish Memorial, Minneapolis	1,667	4	1:418
Burnside Hospital, Toronto	3,982	8	1:861
Hartford Hospital	15,817	444	1:36
Lowest year since 1911	424	2	1:212
Highest year	1,154	68	1:17

Table No. 2 shows figures compiled by Tottenham as quoted by Mosher[1] together with figures showing the frequency of caesarean section at the Hartford Hospital. Tottenham's figures indicate a "caesarean complex" in certain localities and, judged thereby, the Hartford Hospital must be classed as one where caesareans are done on comparatively broad indications.

During these years six staff members, two

chiefs and four assistants, have operated on 123 ward patients, 53, 41, 14, 10, 2 and 1 respectively. Internes have done 24 operations under the guidance of staff physicians. Differences in length of service account for most of this unequal distribution. During the same time, however, 320 caesareans were done on private cases, which numbered approximately 50% more than ward cases. Here also, duration and size of practice, both personal and consulting, accounts for much of the difference, though there is a striking difference in the indications used by the various men which can be appreciated by reviewing the histories themselves. For example, during the past eight years on the ward service Dr. A. did one caesarean for every thirty-eight cases, Dr. B. did one for every sixty-three. During the past four years on private patients Dr. A. did one out of every 4.8 whereas Dr. B. did one out of every ten.

Six histories could not be located, but essential data were obtained from the labor record book or from physicians in all but one case. In general the histories were much better on the ward service than on the private service and frequently a diagnosis of toxaemia or contracted pelvis was a mere statement of the physician unfortified by specifications.

Table No. 3 shows a synopsis of the history of caesarean sections at the Hartford Hospital from the first operation done by Dr. P. H. Ingalls. This patient was an Italian woman aged 21, a primipara who could not be delivered by her physician at home even by the use of forceps. Both mother and child survived. So far as could be learned, this was the first caesarean section done in Connecticut. The second operation was done by Dr. Melancthon Storrs assisted by Dr. Ingalls. The child's body had been previously torn from the head and the latter was removed by laparotomy. This mother also survived. For comparison the first eight years have been grouped together and the others divided into five year periods.

The increase in frequency of caesarean section shown in this table is all the more significant when it is noted that during the same period there has been a great increase in the number of cases delivered in the hospital. During the last ten years, in Hartford, the proportion of hospital deliveries has risen from 30% to over 70%. We are, therefore, getting in the hospital not

Table No. 3.

Fiscal years.	Deliveries	5 yr. totals	Caesareans	5 yr. totals	Caesarean rate	5 yr. average	Caesarean deaths	5 yr. totals	Maternal mortality	5 yr. average	Foetal mortality	5 yr. average	Percentage non-elective	5 yr. average.
1904-5	85		1				0						100	
1905	73		0				0							
1906	92		1				0						100	
1907*	115		2				0						50	
1908	141		0				0							
1909	220		0				0							
1910	347		0				0							
1911	392	1465	2	6		1:244	1	1		16%		30%	100	84%
1912	424		2		212		0		0		0		50	
1913	488		5		98		1		20		60		80	
1914	674		13		52		2		15.4		15		85	
1915	985		9		109		0		0		21		66	
1916	1026	3597	20	49	51	73	0	3	0	6.1%	0**	12.2%	60	67%
1917	885		28		32		4		17		21		79	
1918	970		17		57		2		11.8		12		47	
1919	979		34		29		1		3		24		35	
1920	794		32		25		2		63		9		41	
1921	881	4509	28	139	32	32	0	9	0	6.4%	21	17%	25	42%
1922	1114		36		31		1		2.7		39		36	
1923	1154		68		16		3		4.4		10		44	
1924	1285		47		27		1		2.1		8		38	
1925	1302		40		33		1		2.5		12.5		35	
1926	1391	6246	59	250	24	25	1	7	1.7	2.8%	8	14%	29	37%
			444	444			20		4.5			15.3% ***		44%

Gross Foetal Deaths 68 outcome unknown 12.
* One history missing, counted in total C.S. but not in mortality.
** Unknown 3 cases.
*** Unknown 12 cases.

63 should appear 6.3 under the heading "Maternal Mortality"—1920.

a larger but a smaller proportion of serious cases and the increase in caesareans must be ascribed to a change in attitude on the part of both physicians and patients. Normal parturition is growing rarer each year.

slipped by. It must be conceded that the decision was often arbitrary, but no attempt was consciously made to be other than fair.

Comparing this table with those to follow, it is clear wherein lies the danger of caesarean

TABLE NO. 4

CAESAREAN SECTIONS

		05-13	14	15	16	17	18	19	20	21	22	23	24	25	26	Tot.	Gr. T.
Classical	W.	9	9	5	11	12	7	5	7	4	5	13	4	5	12	108	
	P.	3	4	4	9	16	10	29	24	29	50	50	31	18	22	271	379
Low	W.	0	0	0	0	0	0	0	0	0	0	0	2	2	2	6	
	P.	0	0	0	0	0	0	0	0	0	0	1	5	13	20	39	45†
Hysterectomy	W.	0	0	0	0	0	0	0	1	0	2	4	0	2	0	9	
	P.	0	0	0	0	0	0	0	0	2	0	0	5	0	3	10	19‡
Sterilized*	W.	0	1	1	2	1	0	1	2	2	3	2	3	4	8	28	
	P.	0	0	1	2	2	1	4	7	7	6	8	11	6	12	66	94

*"Sterilized" does not include Hysterectomy.
†One death.
‡One death.

Table No. 4 shows the type of operation performed, together with the number in which the tubes were excised or ligated. If we add to the group which were sterilized the number who underwent hysterectomy, we see that 115 out of 444, or 26% were rendered incapable of further child-bearing as a result of their operative experience. This does not include the deaths. There usually appeared to be a good and sufficient reason for this action, inevitable in some cases and in others a matter of wise choice in the face of grave constitutional disease or multiple operative deliveries. It must be remembered, however, that caesarean sections tend to place a restriction on the size of the family. The proportion of low type and radical operations is too small and too recent to show any striking reduction in mortality which it is reasonable to expect from these procedures.

section. Aside from the risks of any operation which may be too lightly passed over by the occasional surgeon or by the surgeon who does not study his results in large series, there are two principal dangers inherent in this operation: (1) operating at a time when the risk has reached large proportions, and (2) operating on patients who are suffering from conditions which in themselves carry a high mortality.

It requires considerable courage to refuse to take the easy way out of a difficult situation and it is comforting to those who have stood by the non-operative treatment of eclampsia to see that the actual results of operative treatment do not appear to justify it. (See table No. 11.)

Wound infections have been recorded in every case where there was mentioned even a drop of serum. It may be noted that at least seven of

TABLE NO. 5

		05-13	14	15	16	17	18	19	20	21	22	23	24	25	26	Tot.	Gr. T.
At term	W.	9	5	2	8	5	2	3	7	2	4	6	3	4	14	74	
	P.	3	2	3	6	11	5	15	16	17	17	22	28	23	37	205	279
28-38 weeks	W.	0	4	3	3	6	5	1	1	1	3	10	3	5	0	45	
	P.	0	2	1	2	4	5	12	5	5	10	23	12	6	6	93	138
Under 28 weeks	W.	0	0	0	0	1	0	1	0	1	0	1	0	0	0	4	
to 20 weeks	P.	0	0	0	0	1	0	1	3	2	2	4	1	2	2	18	22

Table No. 5 shows the duration of pregnancy. I have arbitrarily excluded hysterotomies done before the 20th week since in many respects they differ from the others and the line must be drawn somewhere.

Table No. 6 contrasts the morbidity and mortality in the two main groups, emergency and elective operations. Where I was able to determine that the decision to operate was made in advance of labor or early in labor and in the absence of signs of a critical nature, I have called the operation elective. All eclamptic cases were classed as emergencies together with those where the time of election had already

the fatal cases classed as emergencies (table No. 7) would have had wound infections had they lived long enough. In two cases the entire wound broke open with eventration of the bowel; resuture in each case led to complete recovery. In neither case was frank wound infection noticed. The criterion of morbidity was taken as 100.4 F. or over, on any of the first ten days after operation, no matter what was the cause. Were it possible to make a division between non-uterine fevers, those due to post-operative reaction, pyelitis, simple mastitis, fever of eclampsia, etc., as contrasted with fever due to endometritis, wound infection, etc., the contrast

between the morbidity of the elective and emergency groups would be much more striking.

Table No. 7 shows that in the elective cases, there is no death that can be considered anything but an accident, and I think that they all might have occurred in the hands of any expert obstetrician. The tetanus case was proven by autopsy and bacteriological study to be clearly a catgut infection. The second patient had an enormous fibroid uterus complicating pregnancy. The third had a bad cardiac lesion which had been carefully prepared with rest and digitalis and seemed to be the kind of risk that must be accepted. It is also not strange to find one death from pulmonary embolism in a group of 444 pregnancies or of operations for any condition.

Concerning the "emergency" cases, one can see the price paid for errors of judgment in dealing with contracted pelves, most of which were brought to the hospital late in labor.

It is to be hoped that these deaths will be fewer in the future, not only because of more prompt consultation with specialists, but also by the wider use of the low caesarean operation in potentially, and the radical operation in the frankly infected cases. Both general practitioner and specialist must grasp this principle in order to reduce the cases of post-caesarean peritonitis. Again, it is wholesome to see that caesarean is not a cure-all method for either placenta praevia or eclampsia. Deaths within fifteen hours in nine cases strongly suggest that the shock of the major operation itself may have been a decisive factor in preventing recovery. These cases constitute nearly one-half of our whole mortality. Such facts engender a wholesome respect for the seriousness of this operation when the patient's resources and margin of safety are reduced by severe toxaemia or by haemorrhage.

Table No. 8 presents a much smaller group,

TABLE NO. 6

CAESAREANS ELECTIVE VS. EMERGENCY

	05-13	14	15	16	17	18	19	20	21	22	23	24	25	26	Total	%	Total %
Elective	3	10	3	8	6	9	22	19	21	23	35	29	26	42	256		
Febrile 1 day	0	0	0	1	3	2	7	11	6	6	8	3	8	13	68	26	
Febrile X days	3	2	3	2	2	4	5	1	8	11	18	14	10	15	98	38	64
Wound Infections	2	0	2	3	1	2	2	2	1	3	6	3	3	2	32	12	
Deaths	0	0	0	0	0	1	0	2	0	0	1	1	1	0	6	2	
Emergency	9	11	6	12	22	8	12	13	7	13	32	18	14	17	194		
Febrile 1 day	1	1	2	2	2	2	1	6	1	0	7	6	5	5	41	21	
Febrile X days	7	5	4	6	13	4	7	4	7	9	32	8	5	10	121	62	83
Wound Infections	3	1	2	0	4	1	1	4	4	0	13	1	1	2	37	19	
Deaths	2	2	0	0	4	1	1	0	0	1	2	1	0	1	15	7	

TABLE NO. 7

CAESAREAN DEATHS

	Indication	Cause of Death	Time	Date
4 Elective	Dystocia	Tetanus	20 days	1920
	Fibroid	Ileus	4 days	1920
	Cardiac Dis.	Cardiac Dis. acute	On table	1923*
	Toxaemia of Preg.	Pulm. Embolism	6 days	1925†
16 Emergency	Placenta Praevia	Sepsis, gas bacillus	2 days	1911
	Dystocia	Peritonitis	3 days	1913
	Prem. Sep. Placenta	Shock	2 hours	1914
	Placenta Praevia	Hemorrhage	On table	1914
	Eclampsia	Eclampsia	On table	1917
	Dystocia	Peritonitis	6 days	1917
	Dystocia	Peritonitis	15 hours	1917
	Eclampsia	Eclampsia	12 hours	1917
	Dystocia	Peritonitis	4 days	1918
	Eclampsia	Post-partum hemorrhage	10 hours	1918
	Toxaemia of Preg.	Acute nephritis	4 days	1919
	Eclampsia	Eclampsia	1 hour	1922
	Placenta Praevia	Post operative shock	2 hours	1923
	Eclampsia	Eclampsia	10 hours	1923
	Dystocia	Ileus	19 days	1924
	Eclampsia	Eclampsia	On table	1926

*Hysterectomy.
†Low type Caesarean.
All other deaths occurred following classical Caesarean Section.

TABLE NO. 8

TABLE SHOWING RELATION OF TIME IN LABOR

	6-24 hrs.	24 hrs.	For whole series
Number of cases 125	74	51	444
Deaths	2.7%	3.8%	4.5%
Wound infections	21%	31%	15%
Febrile 1 day	26%	11%	25%
Febrile X days	55%	73%	49%
Total febrile	81%	84%	74%

TABLE SHOWING RELATION OF TIME OF RUPTURE OF M.M. AND INSTRUMENTATION

	6-24 hrs.	24 hrs.	Previous instrumentation
Number of cases 54	33	12	9
Deaths	6%	8%	0
Wound infections	33%	25%	11%
Febrile 1 day	10%	33%	22%
Febrile X days	82%	75%	56%
Total febrile	92%	100%	67%

TABLE NO. 9

EARDLEY HOLLAND, BIRMINGHAM

CAESAREANS IN GREAT BRITAIN 1911-1920

For Contracted Pelvis	3372
For Eclampsia and Toxaemia	227
For Haemorrhage	208
For other conditions	336

MORTALITY STUDY

For Contracted Pelvis, gross mortality			4.1%
Before onset of labor	1202	"	1.6%
Early in labor	389	"	1.8%
Late in labor			10%
With previous induction			14%
With previous forceps			25%
With previous craniotomy			50%

less than half of the whole series in which it was possible to note the duration of labor prior to operation and also the number of hours which had elapsed since rupture of the membranes. It will be remembered that a very large number were not in labor at the time of operation. These figures may be compared with those of table No. 9 prepared by Eardley Holland.

TABLE NO. 12

PREVIOUS ERRORS IN OBSTETRICAL JUDGMENT

124 Ward Caesareans

52 were multipara
26 were done for disproportion
12 had previously had C.S. for disproportion
4 had had 2 previous stillbirths
13 had had 1 previous stillbirth

320 Private Caesareans

146 were multipara
64 were done for disproportion
30 had previously had C.S. for disproportion
3 had had 2 previous stillbirths
22 had had 1 previous stillbirth

Only 42 out of 90 multipara with disproportion had C.S. done during first labors, which indicates a considerable error in previous obstetrical judgment. Previous stillbirths referred to in this table were caused by dystocia.

These errors in judgment are shown by record of 49 dead babies born to 42 mothers (no histories available in 6 cases), which is a very heavy foetal mortality for this group of 109 multipara. During the same period 76 primipara were done for disproportion.

Table No. 10 shows the series when grouped according to the indications for which the operations were performed. Under the heading "combined indications" are grouped certain cases which presented two or more reasons for choos-

Table No. 10.

CAESAREAN SECTIONS - INDICATIONS

		05-13	14	15	16	17	18	19	20	21	22	23	24	25	26	Total	G.Tot	%
Disproportion	W.	7	5	3	6	9	2	1	3	2	1	4	3	3	6	55		
	P.	2	1	2	2	5	3	12	10	8	6	9	19	13	19	111	166	37.4
Eclampsia	W.	0	2	0	3	2	1	1	1	0	1	1	0	0	0	12		
	P.	0	1	0	1	2	0	2	0	1	4	4	2	1	1	19	31	6.9
Toxaemia	W.	1	0	0	1	1	2	2	2	1	3	3	1	2	1	20		
	P.	0	0	0	0	2	1	12	8	4	11	18	4	4	5	69	89	20.8
Pl.Praevia	W.	1	1	1	0	0	0	0	1	0	0	3	2	0	1	10		
	P.	0	0	0	2	0	3	1	5	2	6	3	3	2	27	37	8.3	
Prem.Sep.	W.	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2		
	P.	0	1	0	1	0	0	0	1	0	0	0	1	0	0	4	6	1.3
Tumors	W.	0	0	0	0	0	0	0	1	0	0	0	0	0	1	2		
	P.	0	0	1	0	1	0	0	0	1	0	0	5	0	2	10	12	2.7
Cervix-Vagina	W.	1	0	0	0	0	0	0	0	0	0	0	0	1	0	2		
	P.	0	0	0	0	2	1	0	2	2	1	1	0	1	2	12	14	3.1
Combined Ind.	W.	0	0	0	0	0	0	0	0	0	0	3	0	0	1	4		
	P.	0	0	0	0	0	0	0	0	2	0	2	1	0	5	10	14	3.1
For Steriliz.	W.	0	0	0	0	0	0	0	0	0	0	1	0	3	1	5		
	P.	0	0	0	0	0	0	0	1	1	2	2	4	1	0	11	16	3.7
For.Prev.C.S. only	W.	0	2	1	2	2	1	2	1	2	2	0	1	3	3	22		
	P.	0	0	0	2	1	2	7	6	2	5	8	7	7	12	59	81	18.7
Other Ind.	W.	0	0	0	1	0	1	0	0	1	2	3	0	0	2	10		
	P.	2	0	0	4	2	4	0	0	0	2	4	1	4	3	26	36	8.5

OTHER INDICATIONS

Prolapsed cord 2, Heart disease 4, Myelitis 1, Renal Calculus 2, Phlebitis 1, Incomplete rupture of uterus 3, Prolonged 1st stage 3, Acute hydramnios 1, Transverse pos. 1, Elderly primip. 4, Fixation of uterus 1, Ankylosis of hip 2, Ruptured uterine vein 1, Unknown 10.

ing operative delivery, none of which by itself would appear to be quite seaworthy but which taken together appear to indicate good judgment. Under "cervix and vagina" are grouped both congenital stenosis and those cases presenting a history of extensive pelvic repair operation. This table more than any other gives a birdseye view of the caesarean situation at the Hartford Hospital and shows in the total figures a point of view more radical than the most conservative, and considerably more conservative than some centers which are afflicted with the caesarean "complex".

Table No. 11 gives the mortality for each indication group.

Table No. 12 is intended to show how often in our multiparae we could clearly read a history of poor obstetrical judgment in previous labors. It very forcefully shows what Dr. Watson has recently said, that we have by no means reached the irreducible minimum in the mortality figures of childbirth. It is true that there will always be errors in the choice of methods of delivery for these cases as long as doctors are human, but this record is not one of which the medical profession of Hartford County can be proud. I should hesitate to present this table were I not convinced that a like study in any general hospital in the country would show a similar situation. One has but to glance at the records of the various public health organizations to realize that there is a crying need of improving the obstetrical care afforded to the great middle class, for the well-to-do can and do purchase good care and the indigent receive it as a perquisite of their poverty.

Table No. 13 shows the foetal mortality.

REFERENCE

1 Surg., Gyn. and Ob., Vol. XLV, No. 5, page 655.

Table No. 11

CAESAREAN SECTIONS - MORTALITY RATE FOR DIFFERENT TYPES

INDICATIONS		Total No. of cases		Deaths		Rate	
Disproportion	W.	55		3		5.5%	
	P.	111	166	3	6	2.7%	3.6%
Eclampsia	W.	12		3		25%	
	P.	19	31	3	6	15.7%	19.3%
Toxaemia	W.	20		0		0	
	P.	69	89	2	2	2.9%	2.2%
Placenta Praevia	W.	10		2		20%	
	P.	27	37	1	3	3.6%	8.1%
Prem. Separation	W.	2		1		50%	
	P.	4	6	0	1	0	16.6%
Tumors	W.	2		1		50%	
	P.	10	12	0	1	0	8.3%
Cervix-Vagina	W.	2		0		0	
	P.	12	14	0	0	0	0
Comb. Indication	W.	4		0		0	
	P.	10	14	0	0	0	0
Sterilization	W.	5		0		0	
	P.	11	16	0	0	0	0
Prev. C.S. only	W.	3		0		0	
	P.	19	22	0	0	0	0
Other Indications	W.	11		1		9%	
	P.	26	37	0	1	0	2.7%

TABLE NO. 13

CAESAREAN SECTION FOETAL MORTALITY

	05-13	14	15	16	17	18	19	20	21	22	23	24	25	26	Total	
Private																
Total Babies	3	4	4	9	16	10	29	24	24	29	51	41	31	45	320	
Outcome Unknown	0	0	0	3	1	0	0	2	0	0	1	0	0	0	7	
Total Viable	3	4	4	8	15	10	28	22	23	27	47	40	30	43	304	
Stillborn	0	0	0	0	1	0	3	0	1	3	2	1	1	1	13	
Foetal Deaths	0	0	1	0	1	2	5	3	4	7	4	3	4	4	38	
Total Foetal Mortality	0	0	1	0	2	2	8	3	5	10	6	4	5	5	51	
Ward																
Total Babies	10	9	5	11	12	7	5	8	4	7	17	6	9	14	124	
Outcome Unknown	1	3	0	0	0	0	0	0	0	0	1	0	0	0	5	
Total Viable	6	9	5	11	11	7	4	8	0	7	16	6	9	14	116	
Stillborn	3	2	0	0	2	0	0	0	0	2	1	0	0	0	10	
Foetal Deaths	1	0	1	0	2	0	0	0	1	2	0	0	0	0	7	
Total Foetal Mortality	4	2	1	0	4	0	0	0	1	4	1	0	0	0	17	15.3%
Total cases	13	13	9	20	28	17	34	32	28	36	68	47	40	59	444	
Known Viable	9	13	9	19	26	17	32	30	26	34	63	46	39	57	420	
Known Lived	5	11	7	17	21	15	25	27	22	22	59	42	35	54	375	

THE DIAGNOSIS AND TREATMENT OF ENLARGED THYMUS BY X-RAY*

BY FREDERICK W. O'BRIEN, M.D.†

THE diagnosis by X-ray of enlarged thymus is made with increasing frequency, so that today, as I said recently in a broadcast[1], it is routine in many of the large and well-equipped hospitals to X-ray all children before submitting them to a general anesthetic. If there is found what is thought to be an enlarged thymus gland, a prophylactic X-ray treatment is given, because of the rather well-entrenched belief that an enlarged thymus gland is an integral factor of the syndrome of so-called status lymphaticus, a reputed cause of otherwise unexplained sudden death.

An enlarged thymus as a symptom-producing organ, and the roentgenologist's ability to diagnose it, have not gone unchallenged. Status lymphaticus, indeed, as a pathologic entity is declared a chimera.

The current practice of roentgenographing children to determine the size of the thymus with a view to radiation treatment before operative procedure may be potent of harm because of its medico-legal implications. If it becomes "common knowledge" in its juridical sense, as applied to the practice of medicine, then the practitioner or specialist who fails to utilize it may lay himself open to suit for malpractice.

If the routine of examining the mediastinum of infants and children is only a vagary of the roentgenologist, it should be abandoned. If it can only be defended on the law of possibility, the method should not be over-emphasized and its limitations should be made clear to the profession.

To complain that thirty treatments with the roentgen ray were given to an idiotic baby because it had attacks of cyanosis, thought due to an enlarged thymus, is not pertinent. Certainly no roentgenologist, as I understand the term, could be guilty of such stupidity. I recently saw a child with a tubercular spine, who had been treated for three months with an air-cooled quartz lamp through a plaster-cast. But why condemn the specialty and ultra violet radiation because some one masqueraded as a pediatrician? These things are only arguments in proof of ignorance, and bear in no way on the question in hand.

Out of the confusion and conflict of opinions, the subject as I see it resolves itself into two propositions:

1. Is there a symptom-producing enlarged thymus in infants that can be diagnosed by X-ray and relieved by radiation?
2. Is there an enlarged thymus without symptoms in infants, children and young adults, that represents objective evidence of status lymphaticus, which can be diagnosed by X-ray and should receive prophylactic radiation?

Noback[2] has shown that the lobation of the thymus is determined early in foetal life. The bi-lobed type of thymus predominates. The conglomerate tri-lobed and the uni-lobed thymus follow in frequency. Its location may be either thoracic or cervico-thoracic, and the latter location is more frequent. The organ is distinctly broad in outline, extending laterally as far as the anterior axillary line in most cases. The foetal thymus is practically never overlapped by foetal lungs, thus leaving its anterior surface directly in contact with the posterior surface of the anterior chest wall. The probable explanation of the broad type of thymus in late foetal life lies in the constant increase in the relative weight of this organ during the last two months before birth. The distinctly broad type of thymus described as being the foetal type is also found to be typical of full-term still-born children.

The thymus in infants in which respiration has been partially or wholly established is usually cervico-thoracic in location, is elongated in form, and bears the impress of the organs with which it is in contact. The right lung extends on its anterior surface in every case, the left lung extends over its anterior surface in four out of five cases. The thymus overlaps the right ventricle of the heart on the right side, in more than fifty per cent. of the cases, and on the left side in more than three fourths of these individuals.

The transition from the broad or foetal type to the elongated or moulded type of thymus found in the individual who has breathed is accomplished during the time in which respiration is completely established. The expansion of the lungs changes the position in relation to the thoracic contents and, along with the other organs and viscera of the thorax, the thymus is markedly affected. It is compressed both laterally and antero-posteriorly with the result of elongation and moulding, and extension over the right ventricle.

Noback believes that in the neonatal period, the degree of expansion of the lungs is a more potent factor in determining the lateral extent of the thymus than the actual size of the organ and during this period at least the thymus, lying in the usually described normal area, may exert marked pressure on the structures posterior to it. This may be due either to an unusually large thymus, or to a very narrow superior thoracic aperture, which will not allow the thymus to protrude into the cervical region, as it is compressed by the expanding lung.

The thymus in late foetal life and in the newborn is related posteriorly to the pericardium

*Read at the regular monthly staff meeting, Cambridge Municipal Hospital, March 13th, 1928, and annual meeting, Connecticut State Medical Society, Bridgeport, Conn., May 23rd, 1928.

†For record and address of author see "This Week's Issue," page 691.

over the base of the heart and great vessels. Noback says that it may extend in exceptional instances, as in one of his series, to the left vagus nerve. On the right it is generally found to be applied closely to the superior vena cava. The left innominate vein and occasionally the superior vena cava is embedded in the posterior aspect of the thymus. In a few cases he found that these vessels actually ran through the substance of the gland. The innominate artery is closely applied to the trachea and crosses it diagonally and the left innominate vein passes across the artery at the level of the upper border of the sternum. An increase in the anteroposterior extent in the thymus in this region would, he says, due to the rigidity of the superior thoracic aperture, compress the above-named structures. In several of his cases this had evidently occurred.

The thymus is not a transitory organ, but exists and functions even until old age, according to Hammar[3], a view which is very generally accepted.

Nothing definite is known about the function of the thymus. It has no secretion, as such; that involution in otherwise normal children begins at puberty connotes a definite relationship to the sex glands. Shellshear[4] in a series of autopsies on the Chinese found abnormally large thymus glands with an abundance of parenchyma in ages up to fifty in subjects showing delayed secondary sexual characteristics.

There has been much experimental evidence in an attempt to link the function of the thymus with nutrition and growth, but Park and McClure[5] have ruled all this out of court as false evidence based on inexact experimental data. Referring to Basch's work on thymectomized puppies, they say: "It seems entirely possible to us that all the changes Basch reported, both clinical and pathological, could readily have been the result of confinement alone or confinement in combination with poor feeding and disease."

Employing a rigid ritual, in their experimental work, both in their method of performing thymectomy and in the care of their animals, in an attempt to reproduce the reported results of prior observers, Park and McClure concluded that the thymus gland is not essential to life in the dog; extirpation of the thymus produces no detectable alteration in the hair, teeth, contour of the body, muscular development, strength, activity or intelligence of the experimental animal. Extirpation of the thymus probably does not influence growth or development. The possibility that it may cause retardation of development, as the late closure of the epiphysis, however, cannot be excluded absolutely. Extirpation of the thymus probably produces no alteration of the organs of internal secretion. It is possible that it produces well-marked changes in the organs of internal secretion during the period immediately following thymectomy, which was not covered by their experiments.

Friedleben, whose celebrated monograph on the thymus gland, Park and McClure declare still remains the greatest single contribution to that subject, concluded that the thymus gland is not essential to life, but that the thymus and spleen together were essential, that the death which follows the removal of both of these organs is one of wasting brought about by the failure in the positive blood formation, caused by the cessation of their combined activities. Nevertheless, he regarded the thymus as an important organ the functions of which were especially concerned with nutrition and growth. Because of his operative method, Park and McClure doubt that any of his thymectomies were complete, thus vitiating his conclusions.

Hammar's view of the function of the thymus, after twenty years of study of this organ, is that the lymphocytes in the thymus are necessary postulates for the function of the organ, but that the essential functional changes take place in the epithelial thymus reticulum, in the form of an enlargement of separate cells or cell-groups, causing in mammals the formation of the concentric cell complexes known as Hassall's corpuscles. These originate under the influence, direct or indirect, of the lymphocytes in the medullary reticulum, which is prepared and sensibilized by special influences, (the thyroid?) and they form the morphological expression of an anti-toxic activity. He shows that the turning point in the existence of this organ is the age of puberty (eleven to fifteen years). Up to this time, not only does the size of the organ itself increase, but what is the essential point, the parenchyma remains undiminished in total volume. After this time, on the other hand, there occurs a rapid reduction of the bulk of parenchyma in the organ, while at the same time the interstitial connective tissue usually assumes the character of adipose tissue and forms a greater and greater part of the organ. It is only after the age of fifty-five, among healthy persons who have met with a sudden death, that we find occasional cases in which a division of the cortex and the medulla can no longer be established, while on the other hand in other individuals, it can be demonstrated under similar conditions quite up to seventy years of age.

Not only in man, but in various animals, has it been possible to establish that age involution of the thymus begins at sexual maturity. That the sexual glands really play a decisive part in the age involution of the thymus is best shown in the condition of the thymus after castration. In the castrated subject, a reduction in the parenchyma takes place, but slowly, which leads Hammar to conclude that by the side of the predominant influence that the sexual glands exert on the process of age involution, other factors at present unknown to us, are, although to a less extent, also operative. The chief cause of the diminution in volume of the cortex is the decrease in the number of lymphocytes.

Hammar says that the thymus is never found

in normal condition in a subject who has died from disease. In such a case the parenchyma is generally reduced by accidental involution. Accidental reduction in the size and amount of parenchyma in the thymus, that is, accidental involution, is produced, he says, not only by the majority of diseases, but also by other sorts of influences,—inanition, roentgen treatment and pregnancy.

The normalcy of so-called persistent thymus, as first demonstrated by Hammar, has been confirmed roentgenographically by Wasson[6] and others, who observed enlargement of the thymus shadow to be the rule in well-nourished infants and children.

Boyd[7] more recently showed in general that the fluctuations in the weight of the thymus at any age are concomitant with fluctuations in body weight, and that the growth curve of the thymus in a well-nourished child is of the same type as that of the lymphoid tissue in general.

Thymus hyperplasia is relatively rare and is found chiefly after castration, also in Graves' disease, Addison's disease, myasthenia, acromegaly, and so-called thymus death. It is only with the latter that I am concerned here.

Cases of thymus death are readily referred to two distinct groups, those with and without symptoms.

Accepting the concept of the evolution of the thymus, I do not find any student of the subject who does not concede the existence of a symptom-producing thymus at least in infants. The group with symptoms usually displays the so-called syndrome of thymic asthma, characterized by attacks of inspiratory dyspnea, inspiratory stridor and the so-called Rehn's symptoms, the expiratory swelling of a tumor, the cranial thymus end in the jugulum.

Hammar states: "It seems to be proved quite conclusively that in certain cases of this kind it really is the thymus that produced the fatal symptoms by pressure on the air-passages." Boyd reconstructs the process this way. During the period in which the thymus in the new-born child is being compressed around and between the mediastinal structures, it is also losing weight. After this process is well under way or is complete, the gland begins to increase in size, so that the portions of the thymus around and between the blood vessels and the trachea may grow sufficiently to cause pressure on vessels and nerves, particularly on the recurrent laryngeal nerve. There are two clinical observations which support such a hypothesis; first, most children do not develop thymic symptoms until from one month to six weeks of age; second, these children frequently have, along with an inspiratory stridor, hoarseness and a crowing cry suggestive of spasm of the vocal chords, of irritation of the recurrent laryngeal nerve. Blackfan[8] noted that this cry sounds like the brassy voice of a man with an aortic aneurism. Such a thymus death is surely to be considered as due to mechanical causes.

The other group of so-called thymus deaths occurring in older children in an apoplectiform manner without premonitory symptoms is the one responsible for the current hospital practice to which I have referred of roentgenographing all children before anesthesia.

The idea of an abnormally enlarged thymus in these cases of death is obviously due, Hammar believes, to a great extent to insufficient knowledge of normal conditions of size in the organs and a misleading comparison between those glands that have not as a rule undergone accidental involution and those that have undergone such involution. He says there is no support for the view that the *primary* cause of death is to be sought for in the thymus, although he cannot exclude the possibility that in such a thymus death there is present in the organism a state of increased vulnerability, which is reflected in the thymus by a less than average number of Hassall's corpuscles, but that in either case it is not reasonable to suppose a reduction of the number of Hassall's corpuscles is the cause of death, but only an expression of a state produced by other parts of the organism, possibly by other endocrine organs.

Boyd considers status lymphaticus a misconception. Someone else has blamed these sudden deaths to improper anesthetization and poor operative judgment and technic. But they occur even without anesthesia and following minor surgical procedures. These are the cases that are the tragedies of practice and if personal, or under one's immediate authority, cause one to pause.

Mosher[9], well aware of the newer concepts, clings to the old idea that the thymus is involved in these sudden deaths, and he has the added argument of no sudden death at his great clinic since his study with MacMillan and Motley. They found out of a total of 2344 children, a positive thymus shadow in 7.5 per cent. Of the positive cases treated by X-ray all were successfully operated on and since employing the routine examination by X-ray of the mediastinum they have had no sudden unexplained death under anesthesia.

This has been the practice for two years at the Boston City Hospital and the Cambridge Municipal Hospital, with both of which institutions I am connected. At the Boston City Hospital, out of a total of more than 2000 children, there has been but one unexplained death under anesthesia, which occurred recently with no prior X-ray. There had been no prior X-ray examination and there was no autopsy. At the Cambridge Municipal Hospital, in 526 cases there have been no deaths. A survey of the chests showed a "broadened mediastinal shadow" in plus six per cent.

Disregarding for the moment enlarged thymus as objective evidence of disease, it is argued that

it is not possible to determine from a roentgenogram whether a thymus is larger than normal or not. Of course the answer here is the same as elsewhere. All that is necessary is to study a large enough group of well and sick by identical technic and plot one's results.

Wasson[6] has made the most adequate roentgen study of the thymus with which I am familiar. He studied a group of children by serial roentgenogram and serial physical examination, from birth to the age of three years. From X-ray and necropsy study, he concluded that the two auricles and the great vessels form the base of the heart shadow; the aorta lies in the middle of the mediastinum and in the new born infant is not seen as a distinct shadow because of its position. It passes directly up, turns directly back, and passes down behind the heart. It is only in later life that it forms the typical aortic arch seen in adults.

If then there is no sizable thymus present, the great vessels, the vena cava, aorta and pulmonary artery, form a shadow, triangular in shape, which quickly narrows as it passes upward toward the first rib, and at its narrowest point is less than the transverse diameter of the shadow of the spinal column. If the thymus is present in any considerable size, it will be found to overlap the base of the heart and pass upward obscuring the shadow just described of the great vessels. The shadow of this thymus is again triangular in shape, with its base overlapping the base of the heart and especially the auricles. Its transverse diameter at its broadest point, which is usually the third interspace, may be two or three times the diameter of the shadow cast by the thoracic spine. This shadow of the thoracic spine is taken by measuring the diameter of the vertebral body. If the shadow of the thymus is no greater than that cast by the great vessels, it is a small thymus.

The position of the infant or child is a much debated point and it is a question whether the roentgenogram should be taken at inspiration or expiration. As Wasson says, it is likely that one could use any one of these methods in a routine manner. The roentgenologist should elect a method meeting his requirements and then make all roentgenograms under these conditions, so that his comparisons and deductions may be uniform.

Wasson selected the posterior-anterior position, in the recumbent position, at full inspiration, which I follow. He insists that these positions be exact with no oblique views unless for special conditions. The diaphragm must curve well downward from well beneath the heart, and its crest should maintain a uniform level on the thoracic spine, which is usually about the eighth vertebra, and is quite uniform in a series of roentgenograms on the same child. Under these conditions, the mediastinal viscera occupy the mediastinal spaces with ease, and neither produce unnatural bulging of the thymus or create a space into which the thymus may fall.

The mediastinal shadow under these conditions is about one and one-third times the bodies of the thoracic vertebrae, unless it is increased by the thymus or some pathologic condition, when measured at the level of the second interspace. He says, "The question must then be answered, 'Does this technique fully portray the thymus gland?'" and he replies, "I have had the opportunity of examining infants and children from birth to a few years of age, both before and after death with roentgen ray and checked with necropsy, and have found the anatomy as portrayed by the roentgenogram to be surprisingly accurate."

His conclusions are that in the infant under two years of age or so, the thymus is variable in size, not only in different types of infants but in the same infant at different times. These thymuses may be classified as to size, and it is found fairly definitely that underweight infants have small thymuses, and those overweight have large thymuses. While the average weight infant usually has a moderate sized thymus, this does not adhere so strictly to the rules. Third, there is an increase in the thymus from birth to one year of age, and it then reduces in size, with certain exceptions when the infant is from twenty-eight to thirty-two months of age, which Wasson called the thymic cycle.

Certainly all overweight children should have the benefit of roentgen ray examination, and it is essential in those of average weight. Many patients are treated indiscriminately when roentgenograms made by chance show a large thymus. Under two years of age, Wasson finds it is only advisable to treat those patients with large thymuses in whom an operation is necessary, or when the infant may be having some symptoms which are definitely due to an enlarged thymus. He writes, "I have seen patients under two years of age treated by irradiation when the roentgenogram happens to show a moderate size thymus and yet may not this thymus be performing its proper function?"

The answer to our first query is clear. An infant presenting an enlarged thymus with symptoms should have radiation treatment. An infant presenting an enlarged thymus without symptoms need not have radiation, unless an operative procedure and general anesthesia is contemplated because in this instance an enlarged thymus may represent the normal growth of the gland.

After the second or third year of life, although the thymus may be increasing in size, the chest is growing at a much greater rate, so that the portrayal of a "broadened mediastinal shadow" on the roentgenogram should suggest a pathological deviation from the normal.

Since our second query concerns the enlarged thymus without symptoms in children, it is not necessary to consider here tracheo-bronchial adenitis or lympho-sarcoma or thymoma except to say that any of these conditions sufficiently

advanced to give a broadened mediastinal shadow would carry with them a very definite clinical picture as well as an X-ray one.

So that I am presuming the six or seven per cent. of cases of "broadened mediastinal shadow" seen in children without symptoms represent at least relatively enlarged thymus glands. No one who is informed thinks for a moment that all of this group represent pathologic glands. This group comprises, undoubtedly, those which have not undergone accidental involution from disease, those in which the rate of chest growth has not kept pace with the thymus, as well as those glands considered potentially a menace.

CONCLUSIONS

Since there is no evidence that the thymus is not an integral causative factor in the type of death under discussion, and it is known that involution of the thymus takes place rapidly and *without harm* (Hammar, loc. cit.) following X-ray or radium treatment, it would appear not only desirable but requisite, until such time as more exact knowledge or experience shall warrant a contrary opinion, to prescribe radiation therapy for those children presenting X-ray evidence of "broadened mediastinal shadow" without symptoms in whom general anesthesia or surgery is contemplated.

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AMNIOTIC FLUID CONCENTRATE IN THE PREVENTION OF ADHESIONS

BY HERBERT L. JOHNSON, M.D.*

IT is the purpose of this paper to report clinical progress in the use of amniotic fluid as a preventive in the prophylaxis of adhesions. For details of experimental work on animals the reader is referred to a recent paper on the subject by Dr. Shields Warren.[1] ("The Effects of Amniotic Fluid on Serous Surfaces" read before the American Association of Pathologists and Bacteriologists, Washington, D. C., May 2, 1928.)

Since our first report upon this work[2] we have developed an "Amniotic Fluid Concentrate" for use in all clinical cases and to a large extent in our laboratory work. We have taken this step not because of misadventure with the whole fluid but to eliminate as much foreign material as possible and to insure sterility and stability of the product. This new product is essentially a fractionated alcoholic precipitate containing the active principle of the whole fluid, thereby permitting us to discard the residual proteins. The concentrate is prepared at the Lilly Research Laboratories from the fluid of certified cows three to five months pregnant. Adoption of this new method of preparation has enabled us to apply large quantities of the concentrate to the peritoneal cavity without fear of untoward results.

Our recent efforts have been directed toward the determination of:

1. The probable mode of action of amniotic fluid on serous surfaces.
2. The applicability of amniotic fluid to synovial cavities.
3. The effectiveness of amniotic fluid in the prevention of adhesions.
4. The type of cases to which amniotic fluid may be safely applied.
5. The immediate and remote post operative effects of amniotic fluid in the peritoneal cavity.

It is apparent from Dr. Warren's[1] work on animals that two of the factors that enter into the action of this fluid are (1) its ability to reduce coagulation time on oozing surfaces about fifty per cent. and (2) its function as a lubricant. The fluid does not cause a foreign body reaction as in the case of inert oils, neither is it absorbed quickly. Traces have been found in the peritoneal cavity up to the third day. The action of this fluid is not dependent on nor even conducive to the production of a transudate in contrast to the effect of hypertonic solutions, such as the dextrose solution recommended by Buchbinder,[3] and is therefore, incapable of causing dehydration. Whether it contains a definite lytic enzyme we are not yet able to determine, but in favor of the presence of such an agent is the fact that boiled fluid does not give the protection afforded by the unboiled fluid. The very slight local leukocytosis produced subperitoneally through the use of amniotic fluid suggests that this agent may to some degree stimulate the natural lytic action of the proteases thereby contributing to the process of resolution.

Animal experiments on serous cavities other than the peritoneum lead us to believe that it may be applied effectively to all serous surfaces. This fact alone will greatly widen our scope of experiments and clinical trial.

*For record and address of author see "This Week's Issue," page 691.

In estimating the percentage of effectiveness of amniotic fluid as a prophylactic against formation of adhesions we are largely limited to observations upon the animal. Conservatively we can say that one-third of all cases are completely protected, one-third will show less than 100% but above 50% protection and the other third will show 50% or less. In a few animals there was complete failure. In every case, however, the controls showed extensive adhesions.

Our present knowledge of this fluid leads us to recommend that its use be confined to clean cases. It has been used in a small number of abdomens in which there was presumptive evidence of infection, or actual infection. In those instances the postoperative recoveries were excellent. The number of cases, however, is far too small to justify any conclusions, and is mentioned merely as of passing interest.

The effect of amniotic fluid on the human must, of course, be estimated from clinical observations, inspection at re-operation, as in repeated caesareans, and the occasional autopsy. The two former criteria are the basis for conclusions in this series, with some assistance from a single case of post mortem inspection of the peritoneal cavity through the operative wound. Inasmuch as the effects of human and cow fluids on animals are apparently identical, it is not unreasonable to assume that these two fluids would have correspondingly similar results on human serous surfaces. It is logical, therefore, that the results observed in re-operative inspection of our caesarean cases may be interpreted as evidence of the effect of the cow fluid used in other abdominal operations.

Our clinical cases are presented in tabular form: table 1 for caesareans and table 2 for all other abdominal operations.

Worthy of comment, in table 1, is a case of

TABLE 1

ANALYSIS OF SERIES OF 65 CAESAREAN SECTIONS; ABDOMEN FILLED WITH WHOLE AMNIOTIC FLUID OR CONCENTRATE

	Primary Indication for Caesarean Section	No. of Operations	Adhesions seen at Operation	Post Op. Cond.	Clinical Perit.	Deaths
SINGLE LAPAROTOMY BY WRITER	Contracted Pelvis	26	None	Good	0	0
	Nephritic Toxemia	‡5	None	Good	0	0
	Previous Extensive Perineal Repair	3	None	Good	0	0
	Placenta Previa, Severe Hemorrhage	3	None	2Fair 1Shock	0	0
	Previous Caesarean Section*	2	1 Moderate 1 Extensive	Good	0	0
	Disproportion	1	None	Good	0	0
	Ruptured Uterus	1	None	Fair	0	0
	Total	41	-	-	0	0
REOPENINGS	Contracted Pelvis	22	1Ext.1Mod. 5Slight,15 None	Good	0	0
	Nephritic Toxemia	0	0	0	0	0
	Previous Extensive Perineal Repair	1	None	Good	0	0
	Placenta Previa, Severe Hemorrhage	0	0	0	0	0
	Previous Caesarean Section	0	0	0	0	0
	Disproportion	0	0	0	0	0
	Ruptured Uterus	1	None	Poor	0	0
	Total+	24	-	-	0	0
	Grand Total	65			0	0

*One case showed extensive adhesions between scar and omentum. The other case showed extensive matted adhesions between parietal peritoneum about scar, omentum, and anterior surface of uterus.

+Two cases showed a delicate strand of adhesion between lower border of the omentum and the abdominal scar. One case showed additional small strand to uterine scar.

‡One case had patient's fluid removed and 50cc "concentrate" substituted.

primary caesarean section for nephritic toxemia in which the patient's own fluid and blood were carefully removed and replaced by 50 c.c. of the concentrate before closing the abdomen. The post operative convalescence was remarkably fine. This case initiated a new technique which I shall continue to employ in caesareans in which toxic or infected amniotic fluid of the patient may be suspected. In table 2 it will be noted that there are two cases in the appendicitis group that had severe emesis. The first of these was a man 38 years old who had been vomiting and hiccoughing for three days before we were called upon to operate. His distention before and after operation was distressing and he did not settle down to a comfortable convalescence until the fourth day. The other case was that of a man 28 years old who developed a mesenteric thrombosis and died on the fifth day. Permission for secondary operation and for autopsy was refused. Post mortem inspection of the peritoneal cavity through the operative wound confirmed the diagnosis and showed the complete absence of adhesions or inflammation.

Careful post operative observations in this series suggest an early return of peristalsis and a hastening of resolution. The former is evident from the early expulsion of flatus (often without assistance), lessened distention, and a shorter period of emesis. The latter is deduced by the lack of pain or tenderness on deep palpation, locally, about the fourth or fifth day following operation. Lack of local distress and of the characteristic stoop when the patient is first permitted to walk are also indicative of more complete peritoneal healing.

The technique employed in the use of this fluid is simple. A warm water bath is used to bring the fluid to body temperature or slightly above. The operator pours the desired quantity into the field of operation just before closing the peritoneum, gently retracting the viscera to permit the fluid to sink deep into the cavity. Good contact with all abraded surfaces is thereby assured. Contact of the fluid with the edges of the wound has no effect on healing. The writer has poured the fluid over abdominal wounds, in human cases, closed them without wiping and found no interference with healing. This test has been made with both human and cow fluid and in each case gave the same results.

Where no contraindications exist, it is my custom to change the position of the patient frequently following operation to cause wider dissemination of the fluid.

TABLE 2

CLINICAL OBSERVATIONS ON 30 CLEAN LAPAROTOMIES TREATED WITH AMNIOTIC FLUID CONCENTRATE

Preoperative Diagnosis	No. of Cases	No. of Prev. Laps.	Condition of Peritoneum at Operation	Operations Performed	Kind & Quant. of Fluid	Immediate Post op. Condition	Early Convalescence			Clinical Peritonitis	Deaths
							Emesis	Flatus	Local Tenderness		
Appendicitis	22	3	3 with dense adhesions between omentum bowel and old scar	Append.22 Oophor. 7 Enucleation of Fibroid 1	Whole 20cc 4 Conc. 25cc 18	Good	Severe2 Mod. 4 Slight 16	Early expulsion 19 Late 3	Early Disappearance 22	0	*1
Cholecystitis	1	0	Good	Cholecystectomy Append.	Conc. 25cc	Good	Slight	Early expulsion	Early Disappearance	0	0
Ovarian Cyst	2	1	2 with dense adhesions between omentum bowel and old scar	Oophor. 2 Append. 1 Salpingectomy 1	Conc. 30cc 1 50cc 1	Good	Mod. 1 Slight 1	Early expulsion 2	Early Disappearance 2	0	0
Intestinal Obstruction	1	1	Dense adhesions between caecum and old scar	Lysis of Adhesions	Whole 20cc	Good	Mod.	Early expulsion	Early Disappearance	0	0
Endocervicitis	1	0	Good	Hyster. Append. Rt.Oophor. Rt.Salping.	Conc. 50cc	Fair	Slight	Early expulsion	Early Disappearance	0	0
Umbilical Hernia	1	0	Good	Herniorraphy Appendicectomy	Conc. 20cc	Good	Slight	Early expulsion	Early Disappearance	0	0
Uterine Fibromata	1	1	Extensive dense adhesions between omentum bowel and old scar	Enucleation of Fibroid Lt.Oophor. D & C	Conc. 50cc	Good	Slight	Early expulsion	Early Disappearance	0	0
Carcinoma of Cervix Uteri	1	0	Good	Panhysterectomy	Conc. 50cc	Fair	Slight	Early expulsion	Early Disappearance	0	0

*Death due to Mesenteric thrombosis. Diagnosis confirmed by post mortem inspection through operative wound.

SUMMARY

The employment of "Amniotic Fluid Concentrate" in clinical and laboratory trial has proved it the equal of the whole fluid. The employment of this concentrate has eliminated the fear of infection and foreign protein reaction in the use of amniotic fluid.

The effects of human and cow fluid on serous surfaces are practically identical.

The mode of action of amniotic fluid on serous surfaces is not entirely apparent, but some cognizance must be taken of its ability to hasten coagulation and its probable function as a lubricant. It is not an irritant or dehydrating agent.

Amniotic fluid may be applied to all serous surfaces.

The percentage of effectiveness of this new agent is conservatively estimated to be seventy per cent.

Amniotic fluid should be reserved for use in clean cases.

Its effect on post operative convalescence is an apparent shortening of the usual period of distress.

The series of clinical cases presented offers reasonable proof that the use of amniotic fluid in the human abdomen is safe.

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AN OUTBREAK OF TYPHOID FEVER TRACED TO CORNED BEEF INFECTED BY A CARRIER*

BY CLARENCE L. SCAMMAN, M.D.,† AND FILIP C. FORSBECK, M.D.†

IN February, 1927, two cases of typhoid fever occurring in different families in Wakefield were reported over the telephone by a physician. He intimated that other illnesses in the town might be typhoid. In view of these hints of possible trouble, investigation was started by the local board of health and this Department.

Wakefield is a town of about 17,000 with a density of about 2,000 per square mile. There has been nothing unusual about the incidence of typhoid fever in this town during the past fifteen years. Two or three cases per year might reasonably be expected.

A hasty preliminary survey revealed that a church supper on January 31, 1927, was the only suspicious common factor among the first cases. The dates of onset made it evident that the infection might have taken place on January 31st. Ninety-seven individuals were found who had been to the supper or who had had food taken home to them. Fifteen sick individuals were finally located. All had positive Widals although none had been immunized against typhoid fever. The incubation period varied from eight to thirty-two days with an average of twenty days. The cases as a group were mild, several being ambulatory. No deaths occurred, although one patient was critically ill with hemorrhages.

Table I lists food eaten by each case and the per cent. eating each food. It shows that corned beef is the only food eaten in common. Five persons, relatives to individuals attending the supper but who themselves had not attended, were sick with typhoid fever. All five had had food from the supper brought home to them. One had corned beef and butter, another corned beef and peaches and cream, and a third corned beef and cabbage salad. Two ate corned beef only.

Table II lists food eaten by the fifteen sick and forty-nine well individuals for whom this information is available, with the number and per cent. eating each food, the difference in per cent. between the number of sick and well individuals who ate each food, and the standard deviations of the differences. The difference in the per cent. of the sick and well individuals who ate the corned beef is 2.0 times its standard deviation, which is somewhat significant. The calculations for the other foods showed no significance. Therefore, the accumulated evidence pointed to the corned beef as the mode of infection.

Attention was then focussed on the source of infection. The meat was prepared at their respective homes by four women. Three gave a negative history of typhoid fever and the only positive Widal was obtained on a woman, Mrs. X., aged 54, housewife, who stated that she had had typhoid fever seventeen years before. A fecal specimen examined in our laboratory was positive for Bacillus Typhosus. Her health was excellent at the time of the supper and thereafter.

Mrs. X. prepared ten pounds of corned beef out of a total of fifty pounds (20 per cent.), took it to the church, and left immediately thereafter. Probably the one batch was infected by the carrier. This agrees with the fact that about 15 per cent. of the guests became ill.

Fifteen individuals prepared or served food in addition to the carrier. One of these fifteen gave an indefinite history of having had typhoid fever. In our opinion this woman is eliminated as the source of infection. She and her two

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†For record and address of author see "This Week's Issue," page 691.

boys had a mild but frank clinical attack of the disease in connection with the outbreak. Further, the foods handled by her at the supper (potatoes and peaches and cream), were eliminated as possible vehicles of infection.

This study illustrates the inherent difficulty of preventing food-borne outbreaks of typhoid fever. Public water supplies are available to 97 per cent. of the inhabitants of Massachusetts. Furthermore, an increasing number of

TABLE I

Food	Cases Eating Food at the Church A	B	C	D	E	F	G	H	I	J	Cases Eating Food at Home K	L	M	N	O	Total No.	Total P.C.
Corned Beef	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	15	100
Cabbage Salad	+	+	+	+	+	+	+	+	+	+	—	—	—	—	+	11	73
Peaches and Cream	+	+	+	+	+	+	+	+	+	+	—	+	—	—	—	11	73
Butter	+	+	+	+	?	+	+	+	+	+	+	—	—	—	—	10	71
Rolls	+	+	+	+	+	+	+	+	+	+	—	—	—	—	—	10	67
Cake	+	—	+	+	+	+	+	+	+	+	—	—	—	—	—	9	60
Potatoes	?	+	+	+	—	+	+	+	+	+	—	—	—	—	—	8	57
Succotash	+	—	+	+	—	+	+	+	+	+	—	—	—	—	—	8	53
Coffee	+	—	+	—	—	—	+	+	—	+	—	—	—	—	—	5	33

TABLE II

Food	Sick No.	Sick Per Cent.	Well No.	Well Per Cent.	Difference in Per Cent.	Standard Deviation of the Difference
Corned Beef	15	100	45	92	+ 8	± 4.0
Peaches and Cream	11	73	44	90	—17	±14.1
Butter	10*	71*	45	92	—21	±14.9
Rolls	10	67	45	92	—25	±15.4
Cabbage Salad	11	73	34	69	+ 4	±15.6
Cake	9	60	—†	—†	——	
Succotash	8	53	29	59	— 6	±19.9
Potatoes	8*	57*	—†	—†	——	
Coffee	5	33	34	69	—36	±22.5

*Out of 14. One individual was undetermined regarding butter, another regarding potatoes.
†No information secured.

This individual and her boys were taken sick at an interval of time after the supper which is consistent with the incubation period of typhoid fever. None of them had ever been immunized against the disease and yet all had positive Widals. In addition, all three ate corned beef, one boy eating nothing else. In spite of all this evidence, the physician in charge failed even to make a diagnosis of typhoid fever, much less report it.

people are refusing to accept the hazard of drinking raw milk. But long after water-borne and milk-borne infections have become a rarity, food-borne outbreaks of typhoid fever will be with us. It is impossible to prevent contamination of food by the unknown carrier.

We wish to express our appreciation of the assistance given in the field by the Wakefield Board of Health and Dr. Lyman Asa Jones of our Department.

WHY THE THURBER MEDICAL ASSOCIATION HAS LIVED FOR SEVENTY-FIVE YEARS

BY J. M. FRENCH, M.D.*

IN the *Journal of the American Medical Association* for July 21, 1900, Dr. T. D. Crothers, editor of the *Journal of Inebriety*, gave a brief sketch of the Thurber Medical Association of Milford, Mass., and stated that it was doubtful if there was any other local country society in the United States which had gone through 47 years of persistent activity and usefulness equal to this. Three years later, on its 50th anniversary, the President of the Massachusetts Medical Society stated that he knew of no other strictly independent local medical society, not yielding allegiance to, or receiving support from, any other society, which had maintained its organization and held regular meetings for as many years as this one.

This claim has been frequently repeated since that time, and so far as the present writer can learn, it has never been disputed. On the 10th day of October of this year, the society will celebrate its 75th anniversary. Its total membership up to this time has been but 156, and its present membership is 30. It is made up almost entirely of country doctors, no one of

*For record and address of author see "This Week's Issue," page 691.

whom is credited by his fellow members with the possession of any unusual ability, or is accorded any of the privileges of leadership, except such as they, as a matter of convenience, may temporarily bestow upon him.

It had its origin in the needs of the country doctors of the middle period of the last century, in the locality which includes the southeastern portion of Worcester county, with the adjacent parts of Middlesex and Norfolk counties. The state society met once a year in Boston, and the nearest district society was in Worcester. By the means of travel then in use, both these places were a long way off, and attendance at the meetings, with the journey to and from, left the doctors but little time to visit their patients nights and mornings. But they had few books and fewer journals, and they were hungry for social and professional companionship and counsel. The result was the formation of this society.

It was organized in the office of Dr. Francis Leland of Milford, June ninth, 1853, by 13 physicians, who were soon joined by four others; and these 17 men, representing 12 towns, are regarded as the founders of the society. All of them were members of the Massachusetts Medical Society. Dr. Nelson of Bellingham was chosen as president, and Dr. Metcalf of Mendon as secretary. The leading spirits in the early days were these two men, with Fay of Milford and Monroe of Medway. Easily the first of these, in the impress which he left upon the society, was John George Metcalf of Mendon, who was its secretary until 1868, then its treasurer until 1881, and a member until his death in 1892, at the ripe age of 90 years. His records are a model of clearness in style, and his penmanship is still as legible as print. He was always present at the meetings, ever ready with paper, discussion, or suggestion, willing to lead or follow.

On motion of Dr. Metcalf, it was voted, "That in honor of the late Daniel Thurber, M.D., of Mendon, this association shall be known as the Thurber Medical Association." The Dr. Thurber who was thus selected as the patron saint of the new society, was a physician of much local renown, who had practiced medicine in Mendon and adjoining towns a generation earlier, and had already been dead for 17 years. His most enduring monument today is this society, which has kept his name and memory green in the hearts of medical men in this vicinity. One other result of the name has undoubtedly been to render the society less narrowly local than it would otherwise have been if named for the town, and the phrase, "Milford and vicinity," has always been interpreted broadly enough to include the residence of any reputable physician desiring to become a member.

The constitution which was adopted, recognized the two chief objects of the society as "medical improvement" and "the cultivation of comity and good fellowship:" and these two objects, the scientific and the social, have always loomed high in the life of the society. Not only has it made its members better doctors, but the friendships it has fostered have been many and lasting. In both these ways it has made our lives better worth living.

In 1858, a movement was undertaken for the founding of a library, and nearly $1000 was secured. Some of this was used in purchasing books, while $600 was invested in the local savings bank, and its income devoted to the general uses of the society. The library was increased each year by purchase and by gift, until it numbered at one time about 1600 volumes. It was kept in the office of the younger Dr. Fay, who was the librarian. After his death in 1883, for a number of years there was no convenient home for the library. But upon the completion of the Milford Hospital in 1903, arrangements were made with its Managing Board, whereby a room for the library and cases for the books were provided for the Association, whose membership furnished most of the attending staff of the hospital. This arrangement is still in force, and here the meetings are held, and the library may be consulted, not only by the members of the Association, but by any other physicians desiring to do so, and the nurses of the training school.

Meanwhile the original $600 has remained in the savings bank, save only that during the World War $500 was invested in a Liberty Bond. The current expenses have mostly been paid by the regular dues, which have never been more than two dollars a year. Two small bequests have been left to the Association, one by an aged member, and one by the widow of a former member. At the last annual meeting, the treasurer reported a balance of $859.96 on hand. This is but a small sum, but more than once it has been large enough to help in saving the life of the society.

When the society was organized, its charter provided that its members must also be members of the Massachusetts Medical Society. But in 1893 an amendment was secured whereby all "regular" physicians were eligible to membership; and again in 1879, the word "regular" was stricken out, and since that time all regularly graduated and legally qualified physicians have been received if acceptable to the members. The rule has worked well with us, and one result has been that our society, which in its early years is recorded as having expelled one of its members for having consulted with a Homeopath, has since twice elected members of this once despised sect to serve them as its president.

In the early years of the society, its meetings were held monthly, instead of bimonthly as at present. The exercises as shown by the records were mainly of three classes: formal dissertations on medical topics; reports of cases, formal

or informal; and an occasional clinical conference, to which the members brought their difficult cases for suggestions as to diagnosis and treatment—for which the patients were charged one dollar. Under these conditions the society prospered, and the attendance in proportion to its membership was much greater than in recent years. Much credit was unquestionably due to the efficient secretary, whose records show unusual ability, and set a high mark which has never been excelled.

For a good many years the society prospered under these conditions, new members were frequently admitted, until in 1882 the total number of members from the beginning had reached 59. But by this time the interest had begun to wane, until in 1883 there were but 16 persons to whom notices of the meetings were sent. In that year the death of Dr. J. Allen Fay, who had succeeded Dr. Metcalf as secretary at the end of 15 years, resulted in a crisis in the life of the Association, which was saved very largely by means of the books in the library, and the balance of cash in the bank.

In this year two of our present members were admitted, while all the former ones have now passed away.

In the years that have followed, we have tried out many different plans for making our meetings interesting and profitable. We have not been uniformly successful; but when one plan failed or was worn out, we have tried to hunt up some other to take its place. As for the individual workers who have furnished us with material for our meetings, sometimes we have relied entirely upon our own members, and sometimes we have brought in men of high reputation from outside, and often we have combined the two methods.

Our studies have included a wide variety of topics, medical, surgical, and obstetrical, as well as many things outside of any of these. We have tried in many ways to make our meetings attractive and profitable, and our society essential to its members. The early way of preparing for our meetings was by the secretary's notification of the members in alphabetical order to prepare and read papers on subjects of their own selection. The plan worked well in the old days, and the attendance was good. But today it taxes our best men acting as a program committee to study up and carry out an attractive and successful program, differing each year from anything we have had before.

We have had the aid of such men as Trowbridge, Gage, Fallon and Kinney of Worcester, Richardson, Garland, Cabot, Smith, Lahey and Jordan of Boston, Collins and Palmer of Framingham, Crothers of Hartford, Lewis of Burlington and New York, Rogers of Providence, Worcester of Waltham, and many others of the best men of New England and vicinity, outside of our own society, and they have given us good service and helped us greatly.

From our own membership we have had symposiums on such burning subjects as pneumonia, influenza, typhoid fever, headaches, and rheumatism; practical papers and lively discussions on all sorts of medical and surgical and gynecological and obstetrical matters. We have discussed the merits and demerits of the various methods of treatment, regular and irregular, homeopathic, eclectic, electric, alkaloidal, physical, and biological.

For many years our annual programs carried on their front page this inscription: It is written in the creed of the Thurber Medical Association that medical men owe it as a debt to their profession, to be leaders in every movement which tends to the promotion of health and longevity, and the increase of intelligence and morality, in the communities in which they reside.

Acting in accordance with this sentiment, we have called in certain sections of the public to consider with us such topics as "Health Problems of Rural Communities," "Periodical Health Examinations," "How to Live a Hundred Years," "The Trained Nurse and the Doctor," "The Medical Inspection of Schools," and "The Care of the Feeble-Minded in Massachusetts," which last subject has been more than once most interestingly presented to a large audience by our own Dr. Wallace of Wrentham. Meetings of this character have been highly appreciated by our people, and have seemed to us to have a proper place in the work of a local medical society.

In 1896, our society made an arrangement with Dr. F. T. Rogers of Providence, editor of the *Atlantic Medical Weekly*, whereby that journal became our official organ, publishing reports of our meetings, and such of our papers as were deemed worthy. This plan worked well, awakening new interest, and increasing both the attendance and the membership. But the life of this excellent weekly was not long continued, and so our hopes were temporarily dashed. But soon afterwards we were able to make a similar arrangement with Dr. H. Edwin Lewis of Burlington, editor of the *Vermont Medical Monthly*. During our coöperation with these two journals—a period of about six years in all—more good papers were written by our members, and most of them published, than at any other period in our history. It is but natural that a man will take more pains and do better work in writing a paper, when he knows that a good number hear it, and a much larger number will read it in print later, than when he knows that only a handful will hear it, and nobody will ever read it. Some of our members also learned to write for other journals, and some of their papers were copied in other journals. In these ways our little society became known to a small section of the medical world as a live wire, even if not a big cable. During this period our society reached the highest membership in its history.

But all things must have an end. Our editor

gave up his small journal, and went down to New York, where he became the successful editor of *American Medicine,* and continued as such until his untimely death a year ago. We have not had any other similar opportunity, for in journals as in societies, the day of small things has gone by. Nor is it certain that it would help us now as it did then. The times change, and we must change with them, and learn to adapt ourselves to our environment.

During the period which has just been spoken of, a proposition was made to us by the president of the Massachusetts Medical Society, looking to the merging of the Thurber into a new district society, thus becoming a branch of the state society, and a component part of the American Medical Association. No doubt this would have rejoiced the hearts of the founders of our society. We also considered it a high honor, and gave it careful consideration. But looking back upon the nearly half century of vigorous life which we had enjoyed, during which our activities had been planned to meet our local and individual needs, and comparing it as best we could with our outlook as a district society, we voted with entire unanimity not to accept the flattering offer, believing that we could do better work for our membership as a whole, and advance our common interests more satisfactorily, by continuing as an independent society, following out our own plans to meet our own needs, as we had done for so many years.

Looking at the question today, with the background of the years that have passed since that time, we can see that there is much to be said on both sides. The difficulties of carrying on a small society successfully are increasing every year. Large combinations are taking the places of small units. None of us would like to give up our little society. Few of us feel that we can afford to keep out of our nationwide organization. But to keep up both, and make them both successful,—and especially our small society—will require increasing effort as the years go by.

Our latest novelty consists in furnishing an excellent luncheon at the close of each regular meeting. We eat it in the library, sitting in chairs with wide arms on which we place the food. We move about with entire freedom, clubbing together as we please, with perfect informality. For sociability this plan cannot easily be excelled. The food is always good, the nurses prepare and serve it, and the Association pays the bills. It works well, and we can afford it—for a while, at least.

We visit neighboring hospitals, hold occasional outings, do all we can to show ourselves friendly, and cater more to the personality of our members than to their profession. And for what, indeed, does the country doctor need a medical society? In these days of autos and airplanes, anyone can go to the city for scientific study. But folks are too thick in the city to leave any room for them to get acquainted with each other. It takes the small local society to meet the needs of the country society.

The highest rank in our membership is that of the Wheel Horse, and of these we have always had a few. The wheel horse is willing to work himself and knows how to get other folks at work. He can see ahead, and knows how to produce results. If it had not been for our wheel horses, we never could have lived 75 years. But most of ours are now dead, and the few that are left, seem to have lost something of the enthusiasm of their youth. We shall need some new ones in order to reach our 100th anniversary.

Our Annual Meetings are held in October. Here we enjoy ourselves, take account of stock, and lay up a store of enthusiasm for another year. Here we bring our wives as regular attendants, and invite our friends as frequent guests. We guarantee a pleasant afternoon, provide a good dinner, get a good audience, and furnish the best entertainment in our power.

At our 50th anniversary, we had just 50 persons at our dinner. The toast "To the Founders of the Thurber Medical Association," was responded to by Dr. Theodore Osgood Cornish of Boston, who was the youngest of the 17 founders, and the only one then living. What the record of the 75th anniversary will be, remains to be seen. But our members and their wives have come to look upon these meetings as the social event of the doctors' year, and to feel that nothing has contributed more noticeably to the longevity of the Thurber Medical Association, than its Annual Meetings.

THE NEW HAMPSHIRE MEDICAL SOCIETY

CHILDHOOD TUBERCULOSIS AND ITS RELATION TO THE CAMPAIGN FOR THE PREVENTION OF THE DISEASE*

BY ROBERT B. KERR, M.D., MANCHESTER†

BEFORE consideration of the major subject of this paper, I should like to present briefly certain phases of what has been aptly termed the changing picture in childhood tuberculosis.

The picture of childhood tuberculosis as we see it clinically seems, in recent years, to have undergone considerable modification.

In my early experience in the hospitals and clinics; gland, bone, joint, meningeal, and peritoneal tuberculous conditions, were quite common.

Tuberculous suppurating glands, bones and joints were the order of the day. This was, of course, particularly true of children, and the orthopedic and general surgeons were kept busy in attending to the surgical tuberculous from the children's wards.

DECREASE IN GLAND AND BONE TUBERCULOSIS

Today it is comparatively rare to see in the hospitals and clinics a child with the matted cervical glands that we saw so frequently fifteen years ago. Every clinician who has practiced over a long period of years is more aware of this decrease.

Large orthopedic centers all over the country report definite decreases in the incidence of bone tuberculosis ranging from 30% to 50%.

Perhaps the greatest single change in the picture of childhood tuberculosis is the very great diminution of the more severe types of glandular tuberculosis, particularly in the large cities.

DECREASE IN DEATH RATE FROM THE NON PULMONARY FORMS OF TUBERCULOSIS

Deaths from non pulmonary forms of tuberculosis are for the most part among children. It is exceedingly interesting to note, in this connection, that the *decreases in the death rate from non pulmonary forms* of tuberculosis during the past ten or twenty years *have been much greater* than the decrease in the pulmonary forms.

In the period 1904 to 1924 in the United States we find a decrease in the total mortality of tuberculosis from 195 to 86 per 100,000 population or a decrease of 56 per cent. A survey of the mortality tables for children under fifteen years of age shows a reduction of from 124 to 40 per 100,000 population or a decrease of 68 per cent., the largest part of the decrease occurring in the non pulmonary forms. In our city of Manchester in 1917 we had 68 deaths from pulmonary tuberculosis and 35 deaths from all other forms. In 1927 the number of pulmonary deaths had decreased to 35 and the number of deaths from all other forms to 14. So that the decrease in the mortality from the non-pulmonary forms during the past ten-year period has been almost one fourth again as great as that from pulmonary tuberculosis. *The very large decreases in mortality from the non-pulmonary forms of tuberculosis is another significant phase of the changing picture in childhood tuberculosis.*

CHANGES IN SEX INCIDENCE

In 1900 the mortality rate from tuberculosis in the males in this country was 13 per 100,000 population greater than in the females and in 1924 the total mortality rate in males was 17 per 100,000 greater than in the females. Notwithstanding this great majority in the males (total for all age groups) we find that in the age groups from 5 to 30 years the majority is greater in the females. This excess mortality in the female is particularly marked in the age group 15 to 19 years in which in 1924 it amounted to 49 per 100,000 population more than in the male. The females have not only failed to make the decided gains in reduction of tuberculosis death rate achieved by the males, but in the age period 15-19 years have lost ground to a startling degree, far exceeding the males in deaths during this period.

The outstanding feature in the tuberculosis death figures is the very marked relative excess of female over male mortality in the years of adolescence—fifteen to nineteen years.

POSSIBLE REASONS FOR EXCESS SUSCEPTIBILITY TO TUBERCULOSIS IN YOUNG ADULT FEMALES

It may not be out of place to hazard a word of speculation as to the reason for the excess incidence of tuberculosis in the adolescent and young adult female.

We have come to believe that most cases of tuberculosis in adolescent and adult life are merely the reactivitation of childhood infections. If this is true, it is reasonable to suppose that the age periods in either sex associated with increased stress or tension are the age periods which should show increased mortality from tuberculosis.

The adolescent and young adult period in the female is undoubtedly a time of stress and strain. Puberty in the female is associated with more physical disturbance than in the male. The young female has, in recent times, taken to industrial pursuits and she is not hardened by heredity or habit, to the hardships of industrial life. She works in the shops, factories, stores, offices and undertakes and often accomplishes the work formerly done by men.

In addition, there has been among the young girls of recent years, a tendency to what may be called "vital dissipation." By this term we do

*Read at the Annual Meeting at Manchester, May 15, 1928.

†For record and address of author see "This Week's Issue," page 691.

not mean wine, song and the other characteristics of dissipation as generally understood. We mean the late hours, dancing, shows, movies, dieting for figure, etc. Anything in fact that reduces the reserve energy of the body.

In the excess prevalence of tuberculosis among adolescent females probably the extreme and foolish dieting of many young women is an important factor. The young female, during the adolescent period of life, frequently has a tendency to plumpness and in an attempt to offset this process of natural development the young girl takes to an extreme, in fact, a starvation diet with disastrous results.

CHANGING PREVALENCE OF INFECTION

It is my impression, judging from my clinic experience, that in recent years we have less tuberculous infection than we used to have. We know that we have a very great decrease in the number of our chronic, advanced, active cases and in our tuberculous gland, bone and joint cases in children.

You *are all familiar with the often repeated statement* that *everyone is infected with tuberculosis.* The statement has been broadcast that all children by the time they reach 15 years of age are infected with tuberculosis germs.

This idea is based upon the early figures of Hamburger, Von Pirquet and other observers in a study made in Vienna, Austria, some years ago. In this connection it should be remembered that Vienna at that time was notoriously the most tuberculous city in the world.

These observers found that practically all children 5 years of age and up to 15 reacted to the Tuberculin Skin Test.

American statistics of recent years are *far different* and show *less than half* the *incidence found in Europe.* Extensive research work done in New York City by the Health Department shows that the positive reactions to tuberculin are becoming less and less in number and in the last 2 years are below any series published in this country. According to their findings not over 40% of the children in New York are infected with tuberculosis germs.

It is interesting, in this respect, to quote a recent statement made by Dr. Allen K. Krause, one of the keenest minds in the tuberculosis field.

"I am inclined to believe that children with tuberculous infection are becoming fewer. Until recently I was inclined to look with some suspicion on reports of the incidence of childhood infection (as determined by skin tests) which made the degree of same unusually low as compared with our standard ideas formed largely between 1910 and 1915. Today there is about one half the general mortality from tuberculosis that there was before, and I am beginning to wonder whether these later records are not revealing to us what we are too blind to see, that is, that the number of infected children is growing smaller."

In my work in New Hampshire, I find the positive reactions much fewer than one would expect. In the city of Nashua during the past 4 years I have personally examined and skin tested about 600 children who were suffering from definite degrees of malnutrition and were picked out for skin testing and X-ray of chest, yet only about 60% of those given the skin test presented positive reactions, and these children were from the undernourished groups and the poorer homes. I found that the malnutrition in the non reactors was caused by other diseases and physical defects, or improper diet or improper health habits, or all of these.

If our surmise is right and statistics over a considerable period of time on a large group of contact and non-contact children show a greatly decreased percentage of Von Pirquet skin test positives, we will have convincing evidence of the most important and significant change in the changing phases of childhood tuberculosis. A consistent and persistent decrease in the incidence of Von Pirquet skin test positives, must be considered from all angles as of first importance.

INCREASED MORTALITY FROM PULMONARY TUBERCULOSIS IN CHILDREN

Recent statistics indicate a very definite *increase* in the *death rate* from *pulmonary* tuberculosis in children. This has been noted particularly in the large industrial cities during the past ten year period and in the total death rate figures throughout the country. Leaders in the fight against tuberculosis have drawn attention to this changing incidence of the mortality and have pointed out the necessity for concerted action in combating the disease among children.

It should be a source of gratification to the people of New Hampshire to learn that the reductions in the death rate from pulmonary tuberculosis achieved during the past ten year period have been participated in by age groups 1-15 years of age, amounting to a reduction of almost 50% and closely paralleling the reductions for all age groups. Yet in the last two years there has been a slight increase in the deaths from pulmonary tuberculosis in the age groups 10-20 in our own state.

INCREASE IN PULMONARY TUBERCULOSIS IN CHILDHOOD AS DEMONSTRATED BY A CONSIDERATION OF THE OPEN CASES

In the Fall of 1924 when I presented my annual report to our State Tuberculosis Association, we had only 27 open tuberculosis cases in children recorded in our clinics; about the same time in 1927 we had 186 such cases with many of these positive sputa cases.

Not only my own experience but that of others, notably, Dr. Rathburn of Chautauqua County, New York, shows increased reports of children who apparently show pulmonary findings. The X-ray is used now more frequently than in for-

mer years and often discloses a serious condition in a child who is apparently healthy. Dr. Rathburn found a considerable number of open, pulmonary cases among the High School groups in Chautauqua County. Not only were these open cases found in the young people obviously underweight and malnourished, but also among those of apparent good nutrition, and even among the athletes.

It is my own impression that pulmonary tuberculosis in childhood is much more common than is generally supposed. This is true particularly with reference to children between 12 and 16 years of age. I believe that we miss many cases of tuberculosis at this period; that many of the conditions diagnosed as colds, bronchitis, pleurisy, etc., are really definitely tuberculosis; that children of this age show a great deal of resistance, and that many of the lesions tend to spontaneous arrest. It seems to me that the general idea as to poor prognosis of tuberculosis in childhood has been exaggerated.

Personally, I feel that many cases seem to tend to arrest or cure even without any particular treatment.

EXAMINATION OF SPUTUM

I wish to emphasize here the necessity of frequent and periodic examination of sputum in children. Many of us find it difficult to secure sputum for examination from children, and are inclined to sidestep the job. One of the physicians in a Children's Sanatorium told me a short time ago that it is possible to get positive sputa even in infants through smears obtained from the posterior fauces using a cotton applicator and causing the little patients to gag and cough. It is my opinion that in later childhood, as well as infancy, a great many more positive sputa will be secured if more patience and skill are expended in collecting the sputa.

POSITIVE SPUTA IN BOYS AND GIRLS

It is interesting to note the relative appearance of positive sputum in boys and girls.

We now have 18 children at the Pembroke Sanatorium. All are afflicted with tuberculosis of the adult type, i. e., pulmonary tuberculosis. Of the eighteen children, 11 are girls and 7 are boys. Of the 11 girls, 5 show the presence of tuberculosis germs in their sputum. Of the 7 boys, but one has tuberculosis germs in his sputum.

A few words with reference to these positive sputa cases may be of interest.

1. Girl from Manchester—E. C. Age 14. Family history unknown, an orphan, now in sanatorium for 3 years. Gained from 92 lbs. up to 104 pounds, has lost to 84 lbs. Is a progessive case, prognosis unfavorable.
2. Girl from Portsmouth—E. C. Age 6 years, upon admission to Pembroke. Mother died of tuberculosis. Child weighed 30½ lbs. on admission (Dec. 1925), now weighs 60½ lbs.
3. Girl from Laconia—C. A. Age 11 years. Mother has tuberculosis, weighed 61 lbs. July 1927 Now weighs 82.
4. Girl from Nashua—I. B. Age 14 years. Family history negative. October 1925 weighed 76 lbs Now weighs 120.
5. Girl from Lebanon—P. A. Age 14 years. Family history negative. December 1925 weighed 52 lbs. Now weighs 84.
6. Boy from Manchester—J. S. Age 14 years. Family history negative. Weighed 63 lbs, February 27, 1928. Now weighs 71 lbs.

FACTORS IN DECREASE OF NON PULMONARY TUBERCULOSIS

What is the causative factor or factors back of the great decrease in non pulmonary tuberculosis in childhood?

The answer, of course, is not far to seek. Pasteurization of milk, tuberculin tested cattle, better hygiene, removal of active tuberculosis cases, particularly advanced cases, from the homes and consequent intimate and prolonged contact with the children, education of the public at large to the dangers of tuberculosis, better economic conditions, with better and more food. The element of pasteurization of milk and tuberculin testing of cattle, is perhaps the most important single factor in the decreased mortality from non pulmonary tuberculosis in children. For while in a few instances bone and gland, meningeal, and peritoneal tuberculosis are due to infection with the human type of tuberculosis, yet the preponderance of evidence indicates that the great majority of these cases are due to infection from the bovine type of tubercle bacillus.

The apparent increase in pulmonary tuberculosis in children is difficult of explanation. Has the newer knowledge of the last five or ten years regarding tuberculosis in children and the consequent campaign of education drawn more attention to this phase of the question with the result that it is *more frequently diagnosed?* Has the isolation of the advanced cases prevented continued massive infection and a resultant generalized tuberculosis? It is quite possible that many of the cases, allowed to remain in contact only a short time were not sufficiently infected to develop a generalized tuberculosis and die, but were sufficiently infected to develop a pulmonary lesion after removal from contact. These are a few of the questions regarding pulmonary tuberculosis in childhood which the work, experience and experimentation of the future will have to answer.

THE CHILDREN'S PLACE IN THE ANTITUBERCULOSIS CAMPAIGN

Recognizing the importance of childhood tuberculosis the Board of Directors of the New Hampshire Tuberculosis Association have for several years past and for the present year authorized concentration of the Association's resources in the work for the discovery and treatment of childhood victims. To this end thousands of children coming in contact with the disease in their homes have been examined in the

Tuberculosis Clinics since the beginning of the intensive campaign by the Association and for several years past the Association has inaugurated a state-wide program of School Examination Clinics particularly for the Examination of Children suffering from malnutrition of 10% or more and of course for other children referred by teachers because of physical disability.

The Association feels that by concentrating upon these groups it can most quickly discover the more definite cases of childhood tuberculosis. At the same time it is not unmindful of the fact that in the High School groups particularly, even among the boys and girls of normal weight, there are a certain number of positive hilus and pulmonary tuberculosis cases which can only be discovered by physical examination and X-ray of chest. During the past year the author of this paper has discovered two cases of pleurisy with effusion and one of empyema in supposedly well children in the schools. At the present time we have under treatment in our clinics approximately 200 open cases of tuberculosis in children, and over 800 cases classified as suspicious hilus tuberculosis.

PREVENTORIA AND HEALTH CAMPS

The past few years' intensive service for the children has already demonstrated the need for sanatorium beds for children with open pulmonary tuberculosis and for a Preventorium and Summer Health Camps and Open Air Schools for children with latent, inactive tuberculosis. A start has already been made in the provision of the Children's Ward for open cases at the Pembroke Sanatorium. Some of our cities are providing Summer Health Camps, notably Nashua, which now has a splendid camp at Sunset Lake in Greenfield for 100 boys and girls. This camp is financed by the Nashua Community Council. Various Civic Clubs and organizations in other cities are making headway in organizing Summer Health Camps. A Preventorium is pitifully needed and the State Tuberculosis Association is hopeful that the near future will see steps taken to meet this need.

THREE DISTINCT TYPES

I would like to emphasize the fact that in Childhood Tuberculosis we have apparently three distinct types of the disease—varying according to the age as follows—infantile, juvenile and adult. I will very briefly outline each type.

1—Infantile

This type of childhood tuberculosis occurs under two years of age. It is a generalized process ending in meningitis, peritonitis etc. The course of the disease is acute, rapidly progressive and fatal, with high temperature and prostration and rapid emaciation. The prognosis is distinctly unfavorable.

The diagnosis is made by—

a. the history of infection, usually there has been an intimate contact in the home from a tuberculous parent.
b. the acute course of the disease.
c. the involvement of the various organs.
d. the signs of acute activity in the lungs.

2—Juvenile

This type occurs between five and twelve years of age. It is a localized process—the involvement is limited to the glands in the neck—cervical adenitis or in the glands at the root of lung,—a bronchial glandular adenitis or hilus tuberculosis. This type is often called pretuberculous or latent tuberculosis.

The course of the disease is benign, undoubtedly the great majority curing spontaneously with calcification of the glands, but a certain small percentage showing a slowly progressive inflammatory process, culminating in caseation and dissemination of the infection into the lung, particularly if the patient is untreated or the resistance is poor, and the environment unfavorable.

This is the type which presents the golden opportunity for preventive work in tuberculosis.

The symptoms in this type are usually malnutrition, general fatigue, nervousness and irritability, slight cough or no cough, slight nightsweats. These symptoms are more particularly present when there is a definite inflammatory process in the glands. However, some cases present no malnutrition or other symptoms.

The prognosis is favorable in the great majority of the cases. Permanent cure is possible if the children receive watchful care and treatment in the home, health camps, Preventorium or Sanatorium. Cure is easy because the disease is as yet retained in the fibrous substance of the glands and the tendency is to encapsulation and calcification.

The diagnosis of this type is not easy. The points in the diagnosis are—

a. the symptoms as above enumerated.
b. the signs at the hilus—a dullness along the spinal column overlying the branching out of the main bronchus. A positive D'Espine sign is very suggestive.
c. The positive tuberculin test.
d. X-ray plate of chest showing enlargement or thickening of the glands about the hilum or root of the lung.

3.—Adult

This type occurs usually from twelve years of age on to adult life. It is a lung process with involvement of the lung parenchyma—distinctly a pulmonary tuberculosis, with of course accompanying bronchial glandular adenitis. The disease has now broken through the fibrous barrier of the bronchial glands into the spongy lung tissue. The disease is now no longer incipient but in the opinion of tuberculosis experts it is advanced—no matter how slight the involvement of the lung tissues may be.

The course of the disease is usually chronic as in the adult type—unfavorable cases requiring treatment and care for a period of months and even years.

The symptoms are approximately the same as in the adult.

a. loss of weight and strength.
b. afternoon temperature.
c. sweats and chills.
d. cough and expectoration.
e. bloodspitting and hemorrhage.
f. tubercle bacilli in sputum in some of the cases.

Some children even with the adult type of tuberculosis, particularly if the process is very low grade, present apparently no symptoms and the condition may only be discovered through the medical inspection in the schools, particularly when the same is followed by specialized chest examination, X-ray and tuberculin skin testing.

The prognosis is guarded. Prolonged treatment may and does save a certain percentage of these cases. Undoubtedly, some spontaneous recoveries occur without treatment even in this type but the percentage is small. Treatment can best be secured in a sanatorium.

The diagnosis of this type is comparatively easy. The points in the diagnosis are the same as those for the adult with pulmonary tuberculosis.

a. symptoms as enumerated above.
b. signs in lungs—dullness, diminished breathing and crepitation.
c. X-ray plate of chest showing mottling in lung parenchyma.
d. tubercle bacilli in sputum in some cases.

GENERAL CONSIDERATION

Much, if not all, tuberculosis begins in childhood. The first tuberculous lesion which can be determined, clinically and by physical examination and X-ray is tuberculosis of the glands at the hilum. (This, of course, excepting the infantile type which is a generalized infection and acute and fatal).

Therefore, childhood is the most important age period in the history of tuberculous disease, because it is the true incipient stage, and most important of all—, it is the time—the golden opportunity when a real cure, a speedy cure, a permanent cure is possible. And the cost of the cure is infinitesimal in comparison with the cost of the protracted and expensive treatment, for the patient, either child or adult, with active pulmonary tuberculosis.

It is very important to recognize and watch the children who are infected, for *if we are to continue to make further gains* in reducing the tuberculosis death rate we must *attack it here* in *its real incipient stage.* These children do very well under watchful care but without it do very badly. If we accept the too current idea that a positive tuberculin skin test means nothing, we lose one of the greatest opportunities of combating the disease in its inmost stronghold, when we have our best chance of wiping it out. We must make the diagnosis as early after infection takes place as possible, before activity and extension begin, and not wait until important or vital organs are attacked by recognizable disease.

The latent stage in childhood—sometimes called the "Pretuberculous" or "tuberculous infection"—is the most important phase of tuberculosis today. This stage occurs mostly in older children over 2 years as I have said before. When we come to make a diagnosis on these children we must bear chiefly in mind that we are not seeking pulmonary tuberculosis as evidenced by crepitation in the lungs but lymphatic tuberculosis as shown by parasternal and paravertebral dullness. Lung signs are very infrequent and we should make the diagnosis long before the lung is involved. This must be done if we are faithful to the high ideals of our profession, for by so doing we will save life and prevent human suffering.

DISCUSSION

DR. BENJAMIN P. BURPEE, Manchester. I believe we should all be very grateful to Dr. Kerr for the presentation of this paper, which it is unnecessary to say is a very timely one. There is little doubt that we all fail to make diagnoses of incipient pulmonary tuberculosis in infants and young children, i. e., hilum tuberculosis, when we should do so, and I think the reason for it is simply this: that in incipient cases it is a mighty difficult diagnosis to make and be sure of. It is easy enough to enumerate the symptoms. We all know those after a fashion. But one author states that 43% of the incipient tuberculous children are of normal weight or overweight. That is one thing that will mislead us. As far as the D'Espine sign is concerned I am frank to confess that for myself it is a very difficult sign to demonstrate and be sure of and if present it does not necessarily mean tuberculosis but may be tracheobronchial adenopathy from measles, pertussis, flu, syphilis, respiratory infections, etc. McPhedran reports that he is unable to recognize a definite group of symptoms from tuberculous tracheobronchial adenopathy and that there is no symptom complex characteristic of it. This seems to me to be a very reasonable and important statement.

X-ray as a means of diagnosing incipient pulmonary tuberculosis is at least not always satisfactory. It has been shown that glands that show up in the X-ray as tuberculosis are not always demonstrable post mortem and all glands are not necessarily tuberculous. Sputum is a difficult thing to obtain in infants and young children. It may be obtained by swabbing the pharynx or as Mercier has suggested by gastric lavage in the morning before the first meal and after the child has coughed up and swallowed

the bronchial secretions. Certainly a very small percentage of tuberculous infants will show a positive sputum at least until the disease is well advanced.

I believe in and would like to make a plea for the more routine use of the skin test by the profession as a means of diagnosis because I believe that it is our best and most accurate single point in diagnosis. Incipient lesions will give a positive reaction. The intradermal test is I think preferable to the Von Pirquet. It is more sensitive and will react when the system is overwhelmed as in miliary tuberculosis or meningitis when a Von Pirquet will not always. Smith of N. Y. has shown it to be twice as accurate as the V. P. while other authors have shown it to be more accurate although not so markedly as that. It would seem preferable because the dosage may be regulated and the tuberculin cannot be rubbed off or neutralized after the test is made. Care must be taken in suspected bone lesions not to use a dilution stronger than 1:200 because of the possible severity of the reaction. Of course some of the positive tests may mean old healed lesions of no particular importance but Dr. John Lovett Morse goes so far as to say that a sick child plus a positive skin reaction is pretty apt to mean a tuberculous disease. At the Balch Hospital we are doing intradermal tests as a routine on all admissions. I believe it would be ideal if we could report all these positive reactions to some one after discharge and have the case followed up until it is certain that the child is no longer actively tuberculous.

Just one word as to therapy at the risk of digressing. I am a firm believer that our most useful single means of therapy is the mercury vapor lamp. I had a case of caseous tuberculous peritonitis with large masses matted together in the abdomen and a small fistula communicating apparently with caseous glands and discharging through the umbilicus. We used the lamp for a little over a year and discharged it absolutely cured—the masses were no longer palpable and the sinus healed.

Dr. Stillman G. Davis, Nashua: I want to compliment Dr. Kerr on his excellent paper. There is little I can add but I would like to emphasize a few points the doctor has made in his paper. In looking over the school records in Nashua I find a definite decrease in bone and glandular tuberculosis. The school records bear out the records in about the same percentage as the doctor has given.

The doctor has done a great deal of work in Nashua, and I want to emphasize some phases of the work as reported by him. During the last four years he has examined approximately 600 undernourished childern in our public schools. These children were ten per cent. or more underweight. A certain percentage were malnourished because of early tuberculosis. I am frank to admit that these cases had slipped through the fingers of the school physicians and were not diagnosed as tuberculous. These children were physically examined. A group of children who were classified as suspects were given skin tests and X-ray examinations. About 60 per cent. of the children who were given skin tests presented positive reactions.

Children classified as suspicious, because of signs in the chest and positive skin test were further examined by X-ray of the chest. I had the privilege of doing this X-ray work at the Nashua Memorial Hospital. With the exception of 2 or 3 cases all presented the typical X-ray findings of hilus or of adult type pulmonary tuberculosis. I understand that there are now 21 children with adult type pulmonary tuberculosis and 103 children with incipient hilus tuberculosis under the supervision and treatment of the Tuberculosis Clinic in Nashua. These children were not found only in the approximately 600 underweights examined by Dr. Kerr but included contacts from other sources.

Going over the records of these children who were underweight I found that the percentage of absences from school was very great in this group. After Dr. Kerr had examined and classified these cases they were X-rayed, and the X-ray demonstrated conclusively to my mind that the juvenile type of tuberculosis isn't commonly recognized.

From the X-rays and from Dr. Kerr's report of these cases it was clearly demonstrated that the glands in the hilus and the bronchial and peribronchial structures were increased in density, and many of the X-ray plates presented a picture suggesting an explosion into the lung tissues, like an active pulmonary, adult tuberculosis.

Now these children who had a definite hilus tuberculosis were given open-air treatment, and other hygienic and dietetic measures were instituted. I have seen these children improve, and comparing their school attendance records since treatment with those preceding treatment their absences from school because of illness have diminished to a great extent.

I am sure Dr. Kerr is absolutely right that the ordinary latent tuberculosis in children, namely: the hilus tuberculosis, is the type which should be recognized early if we are to combat the disease.

Dr. Robert B. Kerr, Manchester (closing): I think I have nothing further to say except to emphasize the point that in making the diagnosis all the elements in the examination must be taken into consideration. We must have signs in the chest, we must have a positive skin test and we must have positive X-ray evidence in order to be sure we are making a correct diagnosis.

PRECAUTIONS ESSENTIAL IN THE SUBMISSION OF CADAVER MATERIAL FOR CHEMICAL EXAMINATION

BY CHARLES D. HOWARD, S.B.*

THE following instructions and suggestions, amplified somewhat with other matter for the purpose of presentation in this publication, have been issued by the New Hampshire Board of Health to medical referees and others in medical practice.

Under the provisions of Chapter 376, Public Laws, respecting the duties of medical referees, it is required that all autopsies ordered by the attorney-general or a county solicitor shall be conducted by a pathologist of the state laboratory of hygiene, unless the attorney-general may otherwise direct. It not infrequently occurs, however, that the taking of material which may prove of toxicological interest and lead to a criminal charge devolves upon the medical referee or a private practitioner.

Where a search for poisons is likely to be involved, whether or not a criminal action is anticipated, we urge that the following precautions be conscientiously observed. These, it should be appreciated, represent no personal whim, but, as too many physicians unfortunately do not seem to understand, embody standard procedure as laid down and distinctly emphasized by such well known authorities as Witthaus, Peterson and Haines, Wharton and Stille, and Taylor. It ought to be obvious that any material deviation from recognized practice is not only unwise at best but might prove most embarrassing in connection with a criminal action.

1. *Containers.* All authorities uniformly specify that these shall be of glass. For the smaller specimens ordinary Lightning type (never Mason) preserve jars will suffice. It is extremely desirable, however, (as well as necessary for the larger organs) that there be kept on hand, with a suitable carrying case, a proper assortment of the regulation type anatomical jars, in accordance with standard procedure as now generally observed elsewhere. Such are a proper charge against the county. It is true that such jars will cost a little money and it is also true that their packing and shipment, where necessary, will entail not only expense but some extra time and labor on the part of the referee. However, "anything worth doing at all is worth doing right". In cases where a crime is involved, delivery by special messenger is very desirable, in fact, almost necessary. All jars should be sealed and should bear labels identifying the origin and nature of the contents, with signature of the referee, and date.

Obviously, all vessels should be scrupulously clean, *as a result of actual washing personally attended to at the time,* leaving nothing to appearance or guess. For this purpose hot water with soap or powder, or hydrochloric acid or alcohol, with aid of a stiff brush, may be used, followed by thorough rinsing and draining. Use no metal tops and beware of jars, covers, gaskets, and rubber aspirating tubes (as for drawing off blood) picked up in undertaking rooms. Such are likely to have paraformaldehyde (solid formaldehyde) sticking to them, which fact might seriously embarrass the subsequent analysis.

Any condition or practice which might involve the taking up of traces of such rather "likely" substances as arsenic, antimony, mercury and lead are particularly to be avoided. For this reason, if there is any question of the presence of a metallic poison, the rubber gaskets on jars should not be used unless previously boiled up well in alkali and thoroughly washed. Gaskets formed from sheets of ordinary butter parchment paper serve well. In handling, do not allow material to come in contact with tables or benches. The use, for temporary holding, of clean, white-enameled basins will avoid this. Do not aspirate blood for chemical analysis through a dirty rubber tube, or a new tube that has not been thoroughly soaked out.

The foregoing may seem presumptuous as addressed to physicians, but long experience indicates that it calls for mention. Conditions which may be entirely proper for specimens for pathological examination will not necessarily serve for the chemical.

2. *Avoid Mingling of Organs and Fluids.* The standard procedure is a separate container for each organ, part or fluid. While this rule can be modified as to certain organs under certain conditions, yet in general it should be adhered to. It should be remembered that in a case involving a trial for homicide by poison, the chemist is not only called upon to describe minutely the condition in which the various organs were received, but also to account, quantitatively, for his disposition of every smallest part of the material submitted. All such must be separately weighed and measured at the start. Any fluids which have exuded must be held with the part of origin. Usually also the analysis in a capital case must be on a quantitative basis, and this means quantitative as to the individual organs and their exudates. One reason for the careful separation of organs will be obvious when it is appreciated that the poison which kills is that which is absorbed and that the portion remaining in the stomach had no part in causing death. Much significance may therefore attach to where the major part of the poison exists.

*For record and address of author see "This Week's Issue," page 691.

Where all organs are mingled together in one or two large jars there is serious likelihood of diffusion and the point in separate analyses largely or wholly lost. Here again, the use of separate jars may entail more labor and expense, but it is the right way.

3. *Material to be Submitted.* If the situation involves any likelihood of a charge of homicide based upon poison it is essential that the following material be made available for examination. While some of it may not be used, yet one cannot be sure as to what may arise and it is better to take, at the first autopsy, all material at all likely to be wanted rather than to be under the need of later calling for a disinterment, as has occurred a number of times in the writer's own experience.

This material would include: (a) stomach and contents, ligated at both extremities and invariably submitted unopened, (b) entire liver, (c) both kidneys, (d) spleen, (e) a properly ligated substantial portion of intestine, (f) the entire brain, (g) portion of blood from cavity, (dipped with a sputum cup or similar small vessel), (h) the lungs, (i) any urine remaining in the bladder, (j) any vomitus deposited on clothing, bedding, or floor (important), (k) any bottles, spoons, glasses, powder, etc., found near the body.

4. *Addition of Preservative to be Avoided.* Under no circumstances should any preserving agent of any kind be added to the contents of the jars. The addition of such a substance as formalin is a grievous error and may serve to absolutely prevent the detection of certain poisons. Even alcohol is decidedly objectionable. The only legitimate preserving means are cold storage and external icing.

In this connection attention may be directed to the provisions of sections 15 and 16 of the New Hampshire law relating to the practice of embalming, which are as follows:

"15. *Accidental Deaths.* No person shall inject into any cavity or artery of the body of any person who has died from an accidental or sudden death, or under suspicious circumstances, any fluid or substance until a legal certificate of the cause of death has been obtained from the attending physician or medical referee, nor until a legal investigation has determined the cause of death. If a criminal cause of death is alleged or suspected no fluid or other substance shall be injected into a body until the cause of death is legally established."

"16. *Embalming Fluids.* The sale or use for embalming purposes of any fluid containing arsenic, zinc, mercury, copper, lead, silver, antimony, chloral, or cyanogen, or of any compound containing any of these, or any poisonous alkaloid, is prohibited, and all brands of such embalming compounds used within the state shall be subject to test and approval by the state board of health."

The practice of employing compounds of arsenic in the manufacture of embalming fluids is obsolete. The modern fluid is essentially a solution of formalin, with denatured alcohol, with certain aromatic bodies, and with or without such ingredients as borax, salicylic acid, saltpetre and coloring. The provisions of section 16 are chiefly interesting at this time because they serve to render illegal the use of embalming fluids containing salts of zinc and mercury, both of which are still employed to some extent.

Violations by embalmers of the provisions forbidding embalming in cases of sudden death, and in connection with which an investigation may be pending or is required, are unfortunately very common, and these are the bane of the toxicologist. Such action on the part of the undertaker is inspired by a natural desire to have his subject presentable for the funeral ceremony, yet this haste to act has undoubtedly been responsible for cases involving a miscarriage of justice as well as for cases where an eventually successful prosecution has been due, not to the chemical testimony but to other evidence adduced*.

In a recent New Hampshire instance involving an undoubted case of suicide, presumably by cyanide poisoning, the undertaker secured permission from the county solicitor to embalm on the representation, as alleged, that this would be done locally only and that the organs would not be affected. Actually, arterial embalming was performed and the stomach and other organs were found to be strongly odorous of formaldehyde. The stomach wall was thickened and contracted, highly hemorrhagic and the contents, consisting of about four ounces of bright bloody fluid, were distinctly acid in reaction, the latter undoubtedly due to the acid character found for the embalming fluid employed. Although the tests were applied but a few hours after the embalming had been performed, these, with the exception of the sulphocyanate, were all negative for hydrocyanic acid,—a circumstance entirely compatible with the existence of a considerable quantity of hydrocyanic acid when combined with formaldehyde. The sulphocyanate test however, applied to some of the fluid direct, afforded weak yet fairly definite positives. This was subsequently confirmed by fractional steam distillation of a portion of the contents, distillation being continued until a total distillate of approximately a liter had been obtained. While all of these fractions afforded an all but imperceptible opalescence with silver nitrate test solution, this opalescence was the most marked in the middle fractions, although none of these individually contained sufficient hydrocyanic acid to give positive tests applied in the usual way. But the settled and separated silver precipitate resulting from combining a number of these

*See case of Commonwealth vs. Mercier, Berkshire County, Mass., 1924, involving an alleged poisoning by sodium cyanide and in connection with which the writer appeared as chemist for the defense. In this case the respondent, who was found guilty of second degree murder, was charged by the Commonwealth with having caused the death of his wife by substituting a bottle containing a darkened solution of sodium cyanide for a bottle of paregoric. The chemist for the Commonwealth was unable, employing the usual tests, to find any cyanide in the contents of the stomach as removed from the embalmed body, but as a result of an investigation using special procedures he did eventually obtain from a small portion of the stomach wall tests which he deemed conclusive of the presence of traces of cyanide.

fractions did afford reactions for hydrocyanic acid.

5. *Chemist to be Informed as to Symptoms, Duration of Illness, etc.* The supplying of such information is not to be regarded as prejudicing the analysis. None except chemists themselves can have adequate appreciation of the difficulties, the amount of labor and the highly protracted nature of a general search for poisons in the animal organism. The above information assists very materially in suggesting the appropriate line of attack, serving as it usually does to rule out from the case certain substances or groups of substances. As decomposition, with attendant loss of some substances, progresses rapidly, any clue which may serve to expedite the detection of a particular substance indicated is most valuable.

6. *Estimation of Alcohol.* Question nowadays rather often arises as to whether or not, in connection with some occurrence, the victim had been drinking. Light can be obtained on this point by an analysis of the blood for alcohol. Inasmuch as in most cases alcohol is completely absorbed in a half hour from a stomach containing no food, and within two hours when taken on a full stomach, it should be obvious that search of the contents for alcohol in connection with such a problem is not likely to afford information of much value.

As alcohol is quickly absorbed into the blood and tissues and as it is known that the distribution is fairly uniform, examination of such an organ as the liver, e. g., will serve, but the blood is more convenient. For this purpose it is desirable that several ounces be collected. The stomach should also be submitted, for the stage of digestion, as well as for evidence of excessive alcohol use.

Where death has occurred following a drinking bout, the public, inspired by the newspapers, is prone to raise the cry of poison liquor. It needs to be appreciated that actually there is very little scientific foundation for such a theory. Alcohols as illicitly dispensed do not, except in rather rare cases, contain foreign matter which is actively poisonous, and practically the exceptions are covered by those cases of redistilled specially denatured alcohol containing relatively small amounts of methanol. With but few exceptions, the numerous specially denatured alcohol formulas do not include actively poisonous ingredients, i. e., the alcohol itself is more poisonous than is the average denaturant, in the quantity present and likely to get into liquor diverted to beverage use. At present those most commonly used in massage and toilet alcohols are isopropyl alcohol and diethyl-phthalate, but the latter is so bitter that no more than traces could "get by" in a beverage.

Our analyses of many samples of illicit spirits indicate that the "poison booze" theory is mainly a figment of the popular imagination. The mere fact of poor flavor is not proof of poison. On the other hand, that many drinkers are nowadays consuming alcohol of a very high concentration, and that in many cases they buy the full strength by the gallon can and "stay with it" until it is gone, there can be no question. It is safe to say that most of the cases informally attributed, in the absence of actual investigation, to "poison booze" might more correctly be ascribed to overdosage with ethyl hydroxide.

MISCELLANY

CLINICAL MEETING OF THE NEW HAMPSHIRE STATE MEDICAL SOCIETY

The first clinical meeting of the New Hampshire State Medical Society was held at Hanover, N. H., September the 5th and 6th, 1928, arranged by a committee appointed by the Medical Society consisting of Elmer Carlton, M.D., Hanover, N. H.; Emery Fitch, M.D., Claremont, N. H.; John F. Gile, M.D., Hanover, N. H. The following program was presented:

PROGRAM

New Hampshire State Clinical Meeting
The Auditorium, Steele Chemistry Building
Hanover, N. H.

Wednesday, September 5th, 1928

9 A. M. *Symposium on Liver and the Use of Liver Extract.* Dr. Frederick P. Lord, Department of Anatomy—Dartmouth Medical School; Dr. Axel Hjort, Department of Pharmacology — Dartmouth Medical School; Dr. Harold A. DesBrisay—Presentation of Cases—Dartmouth Medical School; Dr. William P. Murphy—Peter Bent Brigham Hospital, Harvard Medical School, Boston, Mass.

2 P. M. Dr. Stanley McVicar, Section on Gastroenterology, Mayo Clinic, Rochester, Minn., "Clinical Aspects of Jaundice"; Dr. W. L. Aycock, Harvard Infantile Paralysis Commission, "Infantile Paralysis"; Dr. W. R. MacAusland, "Treatment of Post-Infantile Paralysis".

5 P. M. The Mary Hitchcock Memorial Hospital and Dick Hall's House were open to the guests and members of the Society, for inspection.

7:30 P. M. *Clinical Assembly Dinner, Hanover Inn.* Speaker—Dr. Gordon H. Gliddon, Department of Research in Physiological Optics, Dartmouth Medical School.

Thursday, September 6th, 1928

9 A. M. Dr. Burton D. Hamilton, Boston, Mass., "Angina Pectoris"; Dr. Harry T. French, Presentation of Cases, Dartmouth Medical School; Dr. Stanley McVicar, "Diagnosis of Operable Cancer of the Stomach".

1 P. M. Buffet Luncheon at the Hospital.

2 P. M. Dr. K. N. Atkins, Department of Bacteriology—Dartmouth Medical School, "Interpretation of Bacteriological Laboratory Data"; Dr. Charles Bolser, Department of Chemistry—Dartmouth Medical School, "Interpretation of Chemical Laboratory Data"; Dr. Reginald Fitz—Peter Bent Brigham Hospital, Harvard Medical School, Boston, Mass., "Diabetes Mellitus".

Medical and Surgical rounds were made daily at the Mary Hitchcock Memorial Hospital between 8 and 9 A. M.

The meeting was well attended and proved of unusual interest. The facilties for handling the visiting members were ideal. The surrounding setting was unusual. Through the courtesy of the Hanover members opportunity to visit the various departments of Dartmouth College, the Mary Hitchcock Hospital, including the Dick Hall House and other points of interest, was made available. The Dick Hall House deserves special mention. It is a unique supplement to the hospital world and a monument to parental love and fidelity. It makes available not only medical care and rest but comfort and inspiration. Those who have the opportunity should not fail to visit the Dick Hall House at Dartmouth.

Too much cannot be said of the genial hospitality extended by the members of the committee and the medical men of Hanover. It was voted unanimously by the meeting assembled to recommend to the State Society a continuation of State Clinical meetings.

Dr. Eleanor E. Cowan has moved to 8 Grace Street, Dorchester, Mass., from Concord, New Hampshire.

Dr. William G. Cain of Nashua died recently.

NEW HAMPSHIRE HILLS

New Hampshire hills have faces that wait,
  Faces that wait through the dust of the years,
Faces that know and have always known—
  Faces of prophets, faces of seers.

They know their own and give of their strength
  To those seeking temples. Silent they rise
And austere and lonely—silent they lean
  And give of their music and touch to their skies.

New Hampshire hills whisper beautiful things
  And things terrible out of a bitter past.
They hold the tears that hill-women have shed—
  A sacred vase while time shall last.

And they are tender. Hill-women who come
  Knotted with pain, they draw to their breast
And nourish with love and beauty and silence . . .
  With silence and wisdom and strange hill-rest

New Hampshire hills are the mothers of men,
  The fathers of women—brothers of all;
New Hampshire hills hold an unguessed lore
  That lifts them lonely, that lifts them tall.

MARY SIEGRIST.

THE NEW HAMPSHIRE SURGICAL CLUB

SOME USES OF SUGAR IN SURGERY*

BY STEPHEN RUSHMORE, M.D., F.A.C.S.†

WE have learned, when searching for beginnings, to look to Egypt and it is perhaps here that we find the earliest records of the use of sugar for purposes other than nourishment. Even at a very early date it was recognized that honey tends to prevent putrefaction, and this was one of the substances used in preparation of the body of the dead for preservation. It is tradition that the body of Alexander the Great was prepared in this way, honey being apparently much more commonly used among the Persians than among the Egyptians. It was thousands of years before putrefaction and sepsis as we understand them were distinguished, and hundreds of years passed before we find in the writings of Galen (circa 175 A.D.)[1] a record of the medical application of the fact that sugar resists putrefaction.

Modern medicine was well on its way when Scultetus (1679)[2] recommended powdered sugar for cleansing wounds, "sugar rubbed down to the softest form".

A little later Zorn (1714)[3] stated that sugar caused fresh wounds to heal and cleansed suppurating and foul ulcers, and about the middle of the 18th Century we find a more extended note on the effects of sugar by Pringle[4].

Sir John Pringle was Surgeon General of the English army from 1742 to 1758 and in 1752 published the first edition of his "Observations on the Diseases of the Army". Garrison says of Pringle that he was the "founder of modern military medicine and the originator of the Red Cross idea", and also that "he laid down the true principles of military sanitation".

In Pringle's discussion of Jail or Hospital Fever found in the "Observations" already mentioned, he said: "It is remarkable how much the plague, pestilential fevers, putrid scurvies, and dysenteries have abated in Europe, within this last century; a blessing which we can ascribe to no other second cause than to our improvement in everything relating to cleanliness, and the more general use of antiseptics". "As to diet it may be observed that hopped beers, wine and vinous liquors coming into general use have been some means of suppressing putrid diseases. Greens and fruits are likewise more universally eaten and salted meats make a much less part of our diet than formerly. To this add the more general consumption of tea and sugar, which I have shown elsewhere to be no inconsiderable antiseptics."

He refers to the Appendix in which he describes in some detail many experiments by which he tested his hypotheses.

A pertinent example is Experiment xxvi, in Paper IV, entitled "A Continuation of the Experiments upon Septics; Conjectures about the causes of the decline of putrid diseases, etc". The group of experiments which included Experiment xxvi was on the Effects of certain salts on Putrefaction. Pringle says: "Nor does sugar at all promote putrefaction. A plain syrup has been said to preserve meat better than any brine; and the tests which I have made induce me to think that this is true; as also that weak solutions of sugar are proportionally antiseptic. But, what is remarkable here, though weak solutions of sugar soon yield to the putrefaction of flesh, yet as soon as an acidity is produced from the sugars fermenting, that putrid tendency is either retarded or intirely (sic) overcome."

"To this antiseptic quality in sugar we may perhaps attribute some share in the general decline of putrid diseases."

I have quoted Pringle at length because it is interesting to see how close he came to discovering an important method of treatment, and how he failed to see what lay just before him.

About one hundred years later Abajo (1855)[5] experimented with a mixture of three parts of powdered sugar and one part gum arabic in the treatment of accidental wounds. The results were so satisfactory that applications of the powder were made to wounds of operation. The conclusion from a small series of cases was that while the results were not strikingly better than those obtained by other methods in the best hospitals of Paris, yet the method was effective and simple and the material was easily procurable.

In 1862 Hoppe[6] studied the pharmacologic and therapeutic effects of sugar and while his article is most interesting from several points of view, it is too long to abstract and I can mention only a few of the clinical conditions for which he recommended external applications of sugar: raw skin surfaces, granulating areas, septic sore throat (giving relief from pain when used as a gargle), ulcers in any part of the body, cracked and sore nipples. He especially recommends sugar internally in debilitated conditions of childhood, as cholera and dysentery.

A good test of the value of sugar would lie in the treatment of hospital gangrene and it was toward the end of our Civil War that Packard[7] made this test in a military hospital near Philadelphia. He laid down two principles for the treatment of this terrible condition with which fortunately we have little experience now. The first principle is to cleanse the wound by mechanical means, which he regarded as the main

*Read before the New Hampshire Surgical Club at the Annual Meeting in Manchester, N. H., April 24, 1928.

†For record and address of author see "This Week's Issue," page 691.

thing, using scissors, knife, or forceps to get rid of all sloughing tissue. The second principle is to "prevent oxidation", as he said, by some sort of dressing. For this purpose he used powdered white sugar, thoroughly and thickly dusted over the wound, or a "thick syrup is put on like any other wet dressing, by saturating clean rags with it". Packard preferred the former method. "If the odor does not quickly disappear, add powdered charcoal". Packard then says: "I believe that wounds still healthy may be prevented from becoming foul and gangrenous from the neighborhood of those which are in the latter state by the use of sugar, as a dressing, and that the spread of hospital gangrene in a ward may thus be checked."

Theodor Billroth also used sugar in the treatment of hospital gangrene and in his "Investigations on the Vegetation-forms of Septic coccobacteria" (1874)[8] which represent a vast amount of experimental work, he said: "In the presence of sugar, the putrefactive germs are transformed into yeast, in the absence of sugar into bacteria, apparently." He found that sugar hindered putrefaction and if sugar was added to a putrefying substance the stench would disappear. The epoch marking work of Koch (1876) and Pasteur (1877) had not yet been published. Nine years later Fischer[9] from the Strassburg Clinic is writing on antiseptic sugar dressings. I quote his brief communication almost in full.

"Since May of this year, experiments with antiseptic sugar dressings have been carried on in the Strassburg Clinic. Sugar had already been used in wound dressings and Professor Luecke had the idea of adding a powdered antiseptic to the sugar as a guarantee against infection of the wound while taking advantage of the aborptive power of the sugar".

The sugar and antiseptic were wrapped in gauze making a kind of small cushion which was placed against the closed wound. If there was a skin defect the powder was applied directly to the raw surface.

"The sugar dressing is left in place for 8-14 days, without the sugar dissolving".

"The wounds look clean when the dressing is removed and they never have any foul odor. Never have I been able to detect any germs on the dressings. The granulations develop well under the dressings, have no tendency to bleed, and the scar formation progresses quickly. Wounds closed with sutures have always healed per primam."

Two years later Fischer[10] gave a detailed description of the treatment and results in two hundred cases. The powdered antiseptic, naphthalin or iodoform, had been given up and sugar alone was used. He was much impressed with the favorable results. The operations included amputations, sometimes with preceding sepsis, sometimes for compound fractures with extensive injury, resections of joints, extirpation of tumors, and necrotic bone. There were some minor operations. In extensive suppurations as phlegmon and empyema, he did not use sugar, "because the dressing was difficult of application in these cases and the sugar was dissolved by the profuse secretion from the wound and the patient was thereby made uncomfortable."

Infection of the peritoneal cavity has been a danger which in spite of the progress of modern surgery persists to the present time and is still an important cause of death. Under certain conditions even operation offers no hope of cure. About twenty years ago, some of the problems involved in peritonitis were formulated by Lennander[11] and he discussed methods of dealing with them. In certain cases he recommended pouring into the peritoneal cavity at operation just before closure, a mixture of normal saline, 5-10% glucose solution, with alcohol (2-5%) and such other drugs as seemed indicated, (for example, digitalis). The advantages which Lennander claimed for this procedure did not include any definite antiseptic power of sugar, but by it a hint was given which, with hints from other sources, stimulated Kuhn to make a study of what he called the Biological Treatment of Peritonitis, published in 1911[12]. It is to his study that I would next direct your attention.

Kuhn noted that since 1900 there had been in general three periods in the treatment of peritonitis. In the first, expectancy was the guiding thought, and the patient was kept as quiet as possible giving opium freely and applying ice to the abdomen. In the second period, heroic operative treatment was practiced, free incision or incisions with extensive irrigation, washing of the intestine and closure with many large drains. In the third period, operation was more restrained, irrigation was more limited and closure was with small drains. Toward 1911 there was again a turning toward expectant treatment, but the idea was gaining prominence that peritonitis represents an effort on the part of the body to overcome harmful processes or eliminate harmful material. Treatment, therefore, should be directed toward assisting the protective and healing processes in the body.

Kuhn set for himself the problem of the biological or physiological treatment of peritonitis, and the determination, if possible, of just what this might mean. He had been struck by a comment made by Koerte years before. Koerte had said: "The most important question in operation for peritonitis is what the patient is going to do with the rest of the infection", that is, with the infection that cannot be removed at operation. It is to the treatment of this residue that Kuhn especially directed his attention.

The complexity of the processes going on in the peritoneum is undoubtedly very great. But we may start with the well known observation that if foreign bodies (or living bacteria) are introduced into the peritoneal cavity, the peritoneum shows a certain capacity to overcome harmful influences, which capacity we speak of as its power of resistance.

Resistance to infection is not specific in the

sense that it is peculiar to the peritoneum, though this organ has a very high resistance, and we may employ the term whether it is due to absorption of bacteria (phagocytosis), to weakening of their virulence, to secretion of antibodies, or to other protective mechanisms or reactions. Increase of resistance means, among other things, that the animal does not die from an otherwise lethal dose, as occurs, for example, after the intraperitoneal injection of nuclein, which has a marked effect in increasing the leucocytes. It may, however, be due to entirely different factors, which produce some other change in the physiological function of the tissue.

Peritoneal reaction to bacteria is manifest by two processes, absorption and secretion. By the first, the body attempts to take into itself the harmful substance, in some cases by phagocytosis. If this first defence reaction is not successful, if the injury goes beyond a certain point, the body attempts by secretion to surround, to wall off, to isolate, to expel the injurious material.

The physiological treatment of peritonitis should then take into consideration these two processes of absorption and secretion and find out how they can be stimulated, and accelerated and assisted.

As a matter of experience, peritonitis usually comes for treatment when in the infected area the beneficial process of absorption has ceased and secretion only is taking place. So much damage has been done that the body cannot absorb the injurious material and it tries therefore to get rid of it. The procedure adopted should be such as to take this into consideration. Nevertheless, the biological approach to the treatment of peritonitis will direct attention to both functions, of absorption and secretion, and to interrelations between them and the processes of bacterial activity.

Kuhn reviews a considerable number of observations and experiments noted in the literature, and without presenting clinical material or reports of cases, states his conclusion that sugar solutions are valuable in the treatment of peritonitis. It was well known that under certain conditions, sugar solutions destroy germs and Kuhn's studies were to determine what effect sugar solutions would have in the infected peritoneal cavity.

The details of Kuhn's studies of bacteriological reactions, which he goes into at great length, need not be entered upon here, nor is it necessary to dwell upon his citations from the literature of bacteriology. It is a well established fact that the results of bacterial vital processes can be modified by the nature of the nutrient media and, what is very important from the point of view of disease, marked changes can be produced in the formation of products of alkaline decomposition, of metabolism in alkaline media, as the production of ferments, alkaloids, ptomains, toxins and lysins. Sugar limits the decomposition of proteins by bacteria and may almost completely check the formation of poisonous products. You will recall that this is the substance of Pringle's statement made about one hundred and sixty years before.

It is clear that under certain conditions and in certain strengths of solution, sugar is an antiseptic.

If we next consider the purely physical effect of introducing sugar solutions into the peritoneal cavity, we note that in the first place, the solution tends to separate the coils of intestine, thus facilitating whatever action it may have on the inflamed peritoneum. Also in hypertonic solutions, by osmosis it tends to cause a flow of body fluid, with its antibodies, into the infected area, and if drainage is possible, out through incisions in the abdominal wall; it thus assists in evacuating the products of bacterial activity. It tends to wash the infected area from within outward, by a kind of automatic irrigation. Replacement of body fluid and especially of lost chlorides, by saline infusions, is necessary, as dangerous dehydration may occur. Furthermore, the drainage is facilitated by the action of sugar in preventing fibrin formation[15]. Finally, it is harmless in strengths up to 25 per cent. Glucose solution 5% in normal saline is about isotonic with the blood.

Kuhn was interested particularly in infection of the peritoneum but the results of his studies may be applied to infections in other parts of the body. Apparently his work has received little attention and I find very few references in the literature which indicate that his method of dealing with infection has been given a trial.

In 1913 Magnus[13], however, carried on some investigations. He found that of many samples of sugar bought in the open market, few contained living bacteria and none contained pathogenic germs. Also, he detected little difference in action among the various sugars he tested, if applied externally. He was inclined to attribute the beneficial effect to the powerful osmotic action and withdrawal of water from the bacteria. Magnus found the most striking results in osteomyelitis, but excellent results were obtained with chronic infection in fistulas following wound drainage. Tuberculous processes were not affected except in so far as the wound was cleansed. Although sugar was used freely in large wounds no ill effects were noticed.

Perhaps the value of sugar as food prevented its general use in the World War but Whitehouse[14] tried it with very gratifying results. Hypertonic salt solutions had not produced the automatic wound irrigation so desirable under Wright's opsonic theory of combating infection. Whitehouse used hypertonic glucose for its greater osmotic power, and obtained remarkable changes in the gunshot and shell wounds he was called upon to treat. It is true he used carbolic acid also (1-80) to which he attributed the absence of foul odor to the discharge, but it was the unsatisfactory results of the treatment with salt and carbolic acid that made him add sugar.

My own experience with wound infections has been rather limited, but I have somewhat indiscriminately treated open wound infections with ordinary granulated or powdered sugar, sometimes mixed with a little water to form a paste, with extremely gratifying results. The sugar or paste is applied liberally. In the cases that have come under my observation, the infection has not spread, the wound has quickly become clean and healing has been accelerated. I have not made bacteriological studies similar to those advised with the use of the Carrel-Dakin method, but the rare re-suture of an abdominal incision has healed in a satisfactory manner. In the treatment of infected wounds in children, the absence of irritative properties especially commends the use of sugar dressings.

Summarizing then what has been said concerning this use of sugar in surgery, we have in sugar (and this includes all ordinary sugars, mono- or disaccharides,) and in hypertonic sugar solutions a powerful adjuvant in the treatment of all wound infections to which it can be applied locally. It checks bacterial activity, destroying germs on the surface, by osmotic action it prevents absorption, and automatically irrigates the underlying tissues from within outward with body fluids which assist in destroying the germs below the surface. It promotes granulation and accelerates healing. It keeps the wound clean. It can do no harm except where there are very extensive wound surfaces, or in the peritoneal cavity, where dehydration of the body and excessive loss of chlorides may occur. This danger is easily overcome by the administration of normal saline, and sodium chloride. Twenty-five per cent. glucose in normal saline is regarded as the upper limit of safety in the peritoneal cavity.

There is one important group of infections in which, so far as I know, no application has as yet been made of the antiseptic property of sugar. I refer to puerperal sepsis. Opinion is divided as to the treatment of puerperal sepsis but the weight of opinion today is that, except in cases associated with bleeding or with retained secundines obviously presenting at the cervix, the inside of the infected uterus should be left strictly alone. So firmly have I held this view, which finds strong support in microscopical studies of inflamed tissue, that it is with some hesitation that I advocate any departure from what has seemed such sound practice.

But the chief objection to intrauterine douching in septic conditions of the uterus, has been and is the danger of spreading the infection, through trauma opening tissue not yet infected, by destruction or impairment of the area of protective leucocytic infiltration. A second objection is that the ordinary antiseptic which is strong enough to destroy the germs may destroy living body cells also. Glucose solution in normal saline is safe, and if it can be introduced into the uterine cavity and kept there, it is likely to prove efficacious.

In the cases of puerperal sepsis which I have seen of late, the infection had clearly spread beyond the uterus, and the symptoms were chiefly from the septicaemia and from the distant metastases. In this group treatment of the uterus is not likely to affect the patient's condition. But there is the possibility that, in suitable cases, cases in which the infection is chiefly in the uterus, daily intrauterine douches of 25 to 50% glucose in normal saline might be enough to assist the patient to overcome the infection. I shall be glad to make the experiment as soon as a case of this sort comes under my care.

There is another group of cases in which such hypertonic glucose solutions employed as intrauterine douches may prove useful immediately after delivery, in frank infection of the uterus before or at delivery; or in cases which, from the point of view of infection, may be regarded as borderline cases, but in which because of the good general condition of mother and baby one desires to perform cesarian section.

I have discussed what may be called external applications of sugar to infected areas in the body. Other methods of exhibition are by the intestinal tract, mouth or rectum; subcutaneously and intravenously. Of these, except the intravenous method, I shall say nothing, because of the limit of time, and, of the intravenous use, but a word. It deserves at least an hour for itself. The development of a comparatively simple technic for the quantitative determination of blood sugar and the discovery of insulin have increased greatly the intravenous use of sugar. It is perhaps used indiscriminately. Practically, the method has considerable danger, but most of the danger can be avoided by a careful technic, for pure glucose with pure sodium chloride and pure water, in appropriate quantity, and given at an appropriate rate not only does no harm but may prove life saving in a number of medical and surgical conditions.

The discussion of this interesting theme must be left for another occasion.

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Case Records
of the
Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY R. C. CABOT, M.D.

F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 14331

FRONTAL HEADACHE AND IRRATIONALITY

MEDICAL DEPARTMENT

First admission. An American shipping clerk thirty-four years old entered the hospital December 3 complaining of swelling of the legs of two weeks' duration.

Beginning a month before admission he had dull frontal headache on waking in the morning about once a week for two weeks, passing off after breakfast. He considered himself perfectly well until two weeks before admission. Then he found his legs were swollen at night, especially the right leg. This grew progressively worse until the feet, ankles and lower legs were swollen every night, always more on the right. The swelling always disappeared by morning. Medical treatment for rheumatism gave no relief. Herb tea taken at night was followed by urination once at night and no benefit.

Examination in the Out-Patient Department the day before admission to the wards showed in addition to the findings given below a sallow complexion and ammoniacal breath.

His father died of cancer of the stomach. There were two other cases of cancer in his father's family.

The patient had occasional sore throats in boyhood, stopping at fourteen. At twenty-one he had an attack of unsteadiness on his feet while walking. A physician treated him with pills. He had no return of the trouble. At twenty-four he had blurring of vision due to overuse and entirely relieved by glasses. He had influenza while in the army. His best weight was 140 pounds, eight years before admission, his usual weight 130, his present weight 125½.

Clinical examination showed a flushed young man with slight cyanosis. Throat slightly injected. Heart enlarged to the left. Apex impulse not recorded. Left border of dullness 9.5 centimeters from midsternum, 2.5 centimeters outside the midclavicular line. No other enlargement. A soft systolic murmur at the apex. Brachial arteries hard and tortuous. Aortic second sound accentuated. Blood pressure, right 210/130, left 230/110. Lungs normal. Voluntary spasm of the abdominal wall due to ticklishness. Slight external hemorrhoidal tabs. Slight pitting edema of the shins. Knee-jerks increased. Pupils normal.

Amount of urine normal, specific gravity 1.009 to 1.016, cloudy at all of twelve examinations, alkaline at four, a very slight trace to a large trace of albumin at all. The sediment showed many granular casts at four examinations, some at two others, hyalin casts at six, red blood cells at eight, many leukocytes at two examinations, rare or occasional leukocytes at eight. A two-hourly test showed specific gravity 1.009 to 1.011 in five day specimens and the total night urine; one day specimen 1.020; the slightest possible trace to a trace of albumin in all specimens. Renal function on time, output 30 per cent. Blood: 12,000 to 20,200 leukocytes, 81 per cent polymorphonuclears, hemoglobin 75 per cent, reds 4,912,000, smear normal. Wassermann negative. Non-protein nitrogen 38 milligrams.

X-ray showed no evidence of abnormality of the lungs or diaphragm. The heart shadow was rather round and the curve of the left ventricle distinctly prominent. The heart measurements were well within normal limits (left border 9.5). The aorta was tortuous and unusually prominent in the region of the aortic knob. The frontal sinuses were somewhat irregular in outline. The left was much larger than the right. Both antra were small and somewhat hazy, not definitely pathological.

Temperature 98.2° to 101°, rectal. Pulse 70 to 122. Respirations normal.

An oculist reported slight edema of both discs, a little area of exudate above the macula of the right eye, no flame hemorrhages or macular hemorrhages of either eye. A throat consultant reported diseased tonsils.

The patient was in the ward sixteen days. The edema of the legs subsided. His weight fell from 116 to 108. The blood pressure came down to 185/125. December 15 he was sent to the Eye and Ear Infirmary, where his tonsils and adenoids were taken out. December 19 he was discharged.

History of interval. Owing to his condition at the time of his second admission most of the following history was obtained from his mother and sister. After first leaving the hospital he returned to light work as a shipping clerk and felt very well. At the end of eleven months he began to have a return of his frontal headaches. One day after a short trip he was irrational for thirty-six hours. His physician kept him in bed for three weeks and then had some difficulty in getting him back on his feet. Since that time he had rested in bed about half the day. Eight months before his readmission he began to do a little work caring for poultry and his garden. Two months before readmission his headaches became quite constant and he had orthopnea. He tired easily, slept poorly, and urinated twice at night. Two weeks before admission his condition became worse. He had edema of the feet, vomiting and twitching, more

marked on the right. This had grown severe in the past few days. For the past week his vision had been blurred. Eight hours before admission he fell into a deep sleep. At admission he was awake, with a nervous excitable expression. He had to be roused from deep sleep for the history taking, and dropped asleep again frequently while questions were being asked.

Second admission, December 12, two years after his previous discharge.

Clinical examination showed an emaciated, pale man lying in bed with nervous twitching and rolling of the eyes. Lips pale, with a thin crust of blood about them. Skin icteroid. Teeth poor. Pyorrhea. Heart large. (No measurements.) Aortic second sound ringing. A low systolic murmur at the apex. Vessels small, firm and tortuous but not definitely sclerotic. Blood pressure 240/150 to 170/110. Lungs fairly resonant, with slight dullness at both bases. Coarse and fine moist râles at both bases, with rhonchi and groans. Abdomen slightly distended, otherwise normal. Slight coarse tremor of the hands. Very slight pitting edema of the lower legs. Knee-jerks very active and sometimes threw the patient into a convulsive seizure with two or three general bodily shakes lasting a second or two. The fundi showed no fresh hemorrhages, but scars from old hemorrhages in both fundi. Vessels small and tortuous. Some silvering. No evidence of arteriosclerosis.

Amount of urine 28 ounces on the one occasion recorded, specific gravity 1.008 to 1.015, alkaline at one of six examinations, neutral at two, a large trace of albumin at all six. Sediment loaded with leukocytes twice, a few to occasional leukocytes at all others, (three specimens catheterized,) rare to occasional red cells and rare to many granular casts at five, questionable once. Blood: 16,750 leukocytes, 90 per cent polymorphonuclears, hemoglobin 55 to 65 per cent, reds 2,700,000 to 2,900,000, some achromia, moderate anisocytosis and polychromatophilia, rare poikilocytosis; platelets normal. Wassermann negative. Non-protein nitrogen 160 to 185 milligrams. Uric acid 7.7. Creatinin 9.6.

Temperature 98° to 99.5°, rectal. Pulse 82 to 98. Respirations normal.

December 16 the patient died.

Discussion

BY RICHARD C. CABOT, M.D.

NOTES ON THE HISTORY, FIRST ADMISSION

As far as I know there is no tendency of the right leg to be more swollen than the left. I do not know at all the explanation for that.

Ammoniacal breath is very important if true. It is very important not to mistake the source of the smell. Urine is one of the components of the characteristic almshouse smell. Most of these cases are not uremia but chronic prostatics with more or less dribbling. So that when you notice an ammoniacal smell about a patient it is very important to make sure whether it comes from the respiratory tract.

According to present beliefs the family history of cancer is of no importance here.

Up to the onset of the attack of unsteadiness on the feet, we have nothing else of significance in this case.

NOTES ON THE PHYSICAL EXAMINATION, FIRST ADMISSION

Of course hard and tortuous arteries at thirty-four is a very unusual finding and very important.

The difference in the blood pressure on the two sides may be of some importance, but I doubt it. It could be of importance only in case there were some gross lesion like aneurysm, which does not seem probable. Difference in the two sides is very rare. When that seems to exist it is very seldom due to any cause except aneurysm.

There is much less edema than we were told about.

That record of a swing only from 1.009 to 1.016 in the urinary gravity at twelve examinations always ranges low. That is of importance, how much must be determined later. The single record of 1.020 is rather disconcerting. It has no right to do that. On the other evidence we should say that there is fixation of gravity.

The non-protein nitrogen of 38 milligrams is essentially normal.

In the seven foot plate the striking thing is the curve on the left side, which I think corresponds to an intrinsic hypertrophy of the left ventricle. It always surprises me that you can see the outline of the diaphragm so well. It is only a muscle; it is surprising to see how clear and sharp it comes out here. It is perfectly normal here so far as I know. There is nothing in the lungs that I can see. There is tortuosity of the aorta. In cases of hypertension that does not mean anything except what we have known from other sources. It does not mean aneurysm or anything like that.

Notice how little change there is during his stay in the diastolic blood pressure, which is the important one. There is some change in the systolic, which is not important.

We might guess at this point what diagnosis they probably made. I believe they made a diagnosis of hypertension. On account of his general condition in part, they may have said "malignant hypertension," the type that gets rapidly worse. Ordinarily one fears that the patient is not going to live two years. This patient came back after two years, so that if we had said malignant hypertension we should have been rash.

NOTES ON THE INTERVAL HISTORY

"Eight hours before admission he fell into a deep sleep." That sleep, so-called, may have been coma. There is no difference in quality

as far as I know between sleep and coma. Sleep is normal coma. Coma is abnormal sleep. I do not know any way in which the two conditions can be distinguished. I used to know a boy years ago who slept whenever you gave him the chance, day or night. Like the fat boy in Pickwick, he was always asleep. He would go to sleep eating a plate of soup. That was over fifty years ago. He is still living, though he is much older than I. There could not have been very extensive pathology. He did all the ordinary things people do except earn a living, which he did not need to do. In the case now before us I should not call the condition "sleep" because we have good reason to suppose that his brain is abnormal owing to the poisons circulating in his blood or to the hypertension which I suppose he still has.

NOTES ON THE PHYSICAL EXAMINATION, SECOND ADMISSION

All twitching is nervous so far as I know.

I think that description of the knee-jerks is an instructive record. A knee-jerk is a partial convulsion. Every time you elicit a knee-jerk you elicit an involuntary motion which does not differ in kind from an epileptic convulsion. It differs in degree, in the number of muscles involved. Here is a man all of whose muscles are like a gun with a hair trigger because of a condition of the brain, so that it takes nothing to set them off, that is to make the brain fire all its powers. Here merely starting off one particular twitch starts off the whole body.

A definite anemia has developed in two years, and there has been a very great change in the retention products.

DIFFERENTIAL DIAGNOSIS

There is no occasion to spend time on differential diagnosis in this case. There is no doubt that it is a case of death from hypertension with its results on the heart, brain and kidneys. We are coming more and more to believe that most cases of chronic nephritis come about in this way, as the result, not the cause, of hypertension. If we could get the case early enough we should find hypertension instead of nephritis and watch the nephritis develop. There ought to be some arteriosclerosis, although he is young for it. He ought to have cardiac hypertrophy, especially of the left ventricle, and a nephritis of the vascular type. The picture at the end is what we used to call uremia. There is no better term for it. How far that is due to chemical changes in the blood and their effect on the brain and how far to a physical change, hypertension, I do not believe anybody can yet say. I think both features enter in. One certainly can get something very like it from pure hypertension without nephritis.

This is the sort of case in which one now and then discovers post mortem unexpected cerebral hemorrhage when there has been nothing in the clinical history more definite than this, nothing localizing. Without that we can almost never make the diagnosis of cerebral hemorrhage except when we have a lumbar puncture fluid showing blood.

We are certainly going to find a big heart, in all probability a chronic nephritis, passive congestion of most of the organs, more than you would expect from the edema that was present on the surface. It is possible that we are going to find cerebral hemorrhage. Was the brain examined, Dr. Mallory?

DR. TRACY B. MALLORY: No, sir.

A STUDENT: How can you explain those white cells in the urine?

DR. CABOT: We often find white cells in the urine in cases of nephritis, and it is very hard to make sure whether they come from the kidney or the bladder. Most men past middle life show a varying number of leukocytes in their urine the source of which we cannot identify post mortem. Whether the leukocytes here are of that undetermined type or are definitely associated with his nephritis I do not know.

A STUDENT: He had some focus of infection, didn't he?

DR. CABOT: We do not need to suppose so. Uremia is capable of causing leukocytosis without any infection discoverable post mortem. On the other hand this is just the sort of case, gradually going to pieces through the years, in which terminal infections of the pericardium or of the lung are common. We have no physical signs to base such a diagnosis on, but that does not exclude it.

A STUDENT: Is there any evidence to show that that hypertension was the result of nephritis?

DR. CABOT: I do not see that there is. There is nothing to show that there was not, however. A patient may have nephritis and not show himself in a physician's office or at a hospital until the hypertension has appeared and until it dominates the clinical picture. We do not need to suppose so, however, because we have here no certain definite evidence of nephritis. There are certain cases in which you get first hypertension and then nephritis, the natural supposition being that the first is cause and the second effect. Certainly I believe that also there are rather few cases in which you get first nephritis and then hypertension.

A STUDENT: Can you distinguish renal edema from cardiac edema?

DR. CABOT: In some cases I think we can. In many cases I think we cannot. Especially in children, in the nephritis following scarlet fever or other infectious diseases, one gets edema of the face, the hands, and other parts of the body where it ordinarily would not be found if it were the type we see in cardiac disease. In chronic nephritis I believe the edema is generally of the cardiac type. It is the cardiac part of the cardiorenal disease, not the kidney part, that gives us the edema of most chronic

cases. But some cases showed edema in the face in a way that a cardiac case so far as I know never does.

A STUDENT: He had it at night.

DR. CABOT: It sounds like cardiac, and not renal; it does not convince me that he had renal disease.

A STUDENT: Does this fit with cardiovascular renal disease?

DR. CABOT: Yes, I believe all three are involved.

A STUDENT: Do you think either the renal or the circulatory could be primary?

DR. CABOT: Yes, I do. I do not know what the proportions are. I think it is very much more frequent to have the vascular first and the renal second, but I do not know the figures to prove it.

A STUDENT: How often do you associate frontal headache with this condition?

DR. CABOT: Very often. It is not common with pure heart trouble.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Hypertension.
Chronic nephritis.
Uremia.
Respiratory failure.

DR. RICHARD C. CABOT'S DIAGNOSIS

Primary hypertension.
Hypertrophy and dilatation of the heart.
Arteriosclerosis.
Chronic vascular nephritis.
Uremia.
Chronic passive congestion, general.
Possibly cerebral hemorrhage.

ANATOMIC DIAGNOSES

1. *Primary disease.*

Chronic glomerulonephritis.

2. *Secondary or terminal lesions.*

Hypertrophy of the heart.
Arteriosclerosis.
Serofibrinous pericarditis.
Bronchopneumonia, slight.
Chronic passive congestion, general, slight.

DR. MALLORY: The most important finding in the case was a markedly diseased pair of kidneys. The combined weight of the two kidneys was 175 grams, approximately half the normal bulk. They were shrunken, finely granular, the capsules stripping with considerable difficulty. They were slightly reddish in color, though not markedly so.

The other findings were a hypertrophied heart weighing 475 grams, the majority of enlargement of course being in the left ventricle, a relatively slight degree of chronic passive congestion, and also a relatively slight terminal bronchopneumonia.

There was a terminal pericarditis, one of the commonest findings in death from uremia. The intestines are described as negative. I almost doubt that. With a terminal pericarditis one usually finds a terminal colitis in uremic cases.

The microscopic examination ought to settle the question whether the nephritis or the vascular changes are primary. Unfortunately it did not. If we are to classify this as vascular nephritis at his age it must be of the so-called malignant type. The marked endarteritis in some vessels suggests this. On the other hand there are marked glomerular changes in the two forms, both capsular proliferation and endothelial changes in the glomerular tufts, which are rather hard to reconcile with a purely vascular process. My own belief is that this was a primary glomerulonephritis with marked secondary changes in the vessels, but I do not feel absolutely certain about it.

DR. CABOT: I am interested in these last words of Dr. Mallory's. It is over twenty years that I have been associated with pathologists here and have been asking them just the same question. In the beginning of my service here Dr. Wright and Dr. Richardson used to say, "This is glomerulonephritis" or "This is vascular nephritis." Later they would say, "I guess on the whole it is chronic glomerulonephritis." Toward the end they would discuss it and then it would simply be chronic nephritis. I do not know; I am simply reporting the facts as they are.

I am interested in another case, another example of terminal pericarditis which was not expected or recognized. I do not believe we shall make any progress in that direction. I do not think we have any way of identifying such disease.

CASE 14332

COMPLICATIONS FOLLOWING GASTRO-ENTEROSTOMY

SURGICAL DEPARTMENT

An American club steward twenty-four years old came to the Emergency Ward August 13 complaining of dull pain in the left upper quadrant.

Three years before admission, after a heavy meal of clams, he had considerable sharp epigastric pain and for a month vomited everything he ate. During the next two years he had about a dozen similar attacks brought on by not eating regularly, lasting a day or two and relieved by frequent eating and rest. For ten months his appetite had been poor. In the January before admission he had a very severe attack. X-ray examination in the Out-Patient Department showed the stomach normal in tone and position. It contained a trace of barium at the end of six hours. There was a persistent irregularity in-

volving the first portion of the duodenum. He was put on a six-meal diet, but because of his work was not able to keep to it. He had another severe attack a month before admission and one a week before. For three days he had had dull pain in his upper abdomen, worse in the left upper quadrant, not radiating. He had felt nauseated. Since the evening before admission he had vomited eight or nine times. He had never noticed blood in vomitus or stools.

His father died of heart trouble. One brother died of tuberculosis and a sister had it.

Before he was twelve he had accidents in which both bones of both forearms and the left clavicle were fractured. Eight years before admission he had rather severe frontal headache. At eighteen he had tonsillectomy and adenoidectomy. For six years he had frequently had a granular area on the lower lids. At twenty he had submucous resection. He had frequent head colds and occasional sore throats. His urine was occasionally smoky.

Clinical examination showed a well developed and nourished man with very marked pyorrhea and much dental repair. Cervical glands enlarged. Tonsils scarred from previous removal, —good result. Apex impulse of the heart not seen or felt, no enlargement to percussion. A slight systolic murmur, best heard at the apex. Sounds, action, pulses and arteries normal. Blood pressure 120/80. Lungs normal. Abdominal tenderness, greatest two inches above the umbilicus. Slight tenderness over McBurney's point. No masses, spasm or distention. Rectal examination, pupils and reflexes normal.

Before operation temperature 98.4° to 100.4°, pulse and respirations normal. Amount of urine not recorded, specific gravity 1.028 to 1.030, no albumin, rare leukocytes in the sediment of one of two specimens. Leukocytes 9,000. Wassermann negative.

The morning of August 14 there was practically no abdominal pain or tenderness. August 16 operation was done. The patient did well after it, without pain or nausea for a week. The night of August 23 he vomited. The next morning lavage was attempted unsuccessfully, although he vomited an extremely large amount at the time and had no vomiting for the rest of the day. He continued to vomit greenish material for the next two days. The abdomen was soft, the wound clean, the temperature not elevated. He was having 1/100 grain of atropin every four hours with no symptoms except possibly tachycardia. The night of August 25 he had a "tetanic" convulsion. The next day the blood chlorides were 404, the non-protein nitrogen 172, the CO_2 tension —67.66 volumes per cent.

August 27 a second operation was done. Three days later the patient was still very sick, vomiting considerable dark green material. The stomach tube was left in for constant drainage. September 2 the non-protein nitrogen was 36, the blood chlorides 512, the CO_2 tension 72.4 volumes per cent.

September 3 a third operation was done. Two days later the patient was in poor condition. The stomach tube was still in place, draining more than his intake. He vomited rarely. He was given subpectorals. September 8 he was definitely better, with no pain. The tube was removed. He took water without vomiting. Liquids were gradually increased, and soft solids were added. September 25 he was discharged.

October 5, two weeks after his discharge, he was seen at the Out-Patient Department. He felt well, had a good appetite, and had gained twelve pounds in the two weeks. The scars were clean and solid.

Discussion

BY RICHARD H. MILLER, M.D.

In bringing this case from the Surgical Department I should like to say that it was chosen not because it came to necropsy but because it proved a very valuable lesson in operative treatment.

Of course, a meal of clams was just incidental in the onset of his trouble. The fact that he vomited so much for a month must be taken with a grain of salt; he did not vomit everything, but doubtless did vomit a little every day.

In this man, who was only twenty-four, a robust, healthy young fellow, one has to consider duodenal or gastric ulcer, of neither of which I should say that the history is typical.

He worked in the kitchen of a country club and evidently was not able to curb his appetite. He ate very irregularly, and all sorts of things.

To me the persistence of this gastric distress and pain over such a long period of time would mean that there must have been some organic lesion; but it is not conclusive and it cannot be taken as typical of duodenal ulcer.

Dr. Richard Dresser: The X-ray findings in this case were typical of ulcer of the duodenum.

Dr. Miller: He was an extraordinarily well developed man and looked very healthy. There is nothing in the physical examination of particular importance.

He stayed in the hospital three or four days before operation, with a diagnosis of duodenal ulcer. Operation was done on the 17th of August.

PRE-OPERATIVE DIAGNOSIS AUGUST 17

Duodenal ulcer.

FIRST OPERATION

Gas-ether. Through a right rectus incision it was found that the stomach was of normal size. Just beyond the pylorus there was a small area where the serosa showed some punctate hemorrhages. Underneath this was an area of thick-

ening. No crater was felt. A posterior gastro-enterostomy was performed, using a loop of duodenum about six inches long and anastomosing it in an isoperistaltic manner. Three rows of continuous catgut sutures were used posteriorly and two rows anteriorly. A long, firmly adherent retrocecal appendix was also removed.

Further Discussion

During the first two days he did well, but after that he vomited everything. Nothing went through the gastro-enterostomy opening, and what went through the pylorus got as far as the anastomosis and could go no further. He had a definite high intestinal obstruction. Whether this was due to edema around the stoma or whether it was due to a kinking which pulled on the loop in such a way that nothing came through we never determined. But it is quite true that nothing got beyond that point at all. Food did go into the duodenum, got as far as this opening and stopped. At the end of ten days the patient was definitely failing. He had been given large amounts of subpectoral saline solution in order to keep up the blood chlorides and fluids, in spite of which it seemed to us that he was going to die. We then decided to operate again.

X-ray examination August 27

The examination was made without the motor meal and in the recumbent position only. The barium passed from the stomach into the duodenum without delay. The duodenum was definitely dilated to about twice its usual size. The barium passed to the left in the duodenum to what appeared to be the duodeno-jejunal juncture and then passed to the right in what appeared to be the afferent loop for a distance of two or three inches. At this point there appeared to be a definite obstruction. Marked reverse peristalsis was observed in the duodenum. None of the barium was seen to leave the stomach via the gastro-enterostomy. The efferent loop was not seen. None of the barium appeared to pass into the jejunum except in the region of the afferent loop. "The findings are those of post-operative stomach with a gastro-enterostomy which is evidently obstructed."

Pre-operative diagnosis August 27

Post-operative obstruction following gastro-enterostomy.

Second operation

Gas-ether followed by ethylene. Through a left rectus incision it was found that adhesions had formed around the stoma of the posterior gastro-enterostomy, gluing the distal loop of jejunum against the transverse colon. A finger could be passed through the stoma from the proximal loop into the stomach, but the distal portion appeared to be obstructed. There was also a dense adhesion between the omentum and a lower loop of ileum. This was freed. It was felt that the adhesions around the stomach could not be freed. An anterior gastro-enterostomy was performed, using three rows of continuous catgut sutures posteriorly and two rows anteriorly.

Further Discussion

At the second operation everything was so adherent that it was practically impossible to determine why things were not functioning better. There was a great deal of edema around the original stoma. The small intestines in that area were matted together by rather firm adhesions, and it seemed as if there had been a certain amount of low grade peritonitis. In view of the fact that this patient was going to die unless something was done it was decided to do an anterior gastro-enterostomy, because in the presence of all the edema it was quite impossible to undo the other opening. So a loop was picked up below the point where the original opening was made, brought up around, and a new stoma was made. Of course, if this should function it would serve perfectly well to carry off whatever was taken into the stomach.

He stood the operation well. However, he kept on vomiting all the time for seven days. Nothing went through. Towards the eighteenth day following the first operation he still had high intestinal obstruction. He was kept alive by injections of large amounts of normal saline solution. With a hope of possibly being able to save him, a third operation was done.

Pre-operative diagnosis September 3

Intestinal obstruction.

Third operation

Ethylene. Anaesthol. The original incision just to the right of the midline was opened. All the intestine looked red and edematous. The loop which formed the anterior gastro-enterostomy was easily identified. With some difficulty the dilated duodenum on the right side of the midline was identified and laid bare. An anastomosis was then made between this and the jejunum distal to the anterior gastro-enterostomy. No clamps were used. The operation went perfectly well.

Further Discussion

At the last operation the duodenum was enormously distended. We got another loop of intestine below the anterior gastro-enterostomy of the second operation, brought it up and made an anastomosis. The patient had first of all a posterior gastro-enterostomy which did not work; then an anterior gastro-enterostomy which did not work; and finally a duodeno-jejunostomy which did work.

In about five days after this operation he began to pick up; and he has continued to improve. I saw him in the Out-Patient Department a month ago, at which time he was perfectly well, with no indigestion and no symptoms. He had gained twenty pounds and was going back to work. We are going to try to get him back and X-ray him again and see what has happened.

There is one note which needs our attention, the amount of blood chlorides. A great deal of work has been done in recent years and months on chlorides in the blood in cases of intestinal obstruction. I have in my hand a report on experimental work done on dogs by Dr. James C. White and Dr. Sprague of this hospital. They bring out the very important fact that in every case of high intestinal obstruction there is a marked loss in the chloride content of the blood, and if it is not kept up persistently by injection of chloride solution the patient will lose so much chloride that although his condition may not seem to be particularly worse there will come a time when the chloride is so low that nothing we can do by operation or in any other way will bring the patient back. In these cases of obstruction following gastro-enterostomy, or in a high jejunal obstruction, it is well worth while to give them as much sodium chloride as we think they can stand. At first hypertonic sodium chloride was given; then that was discarded, as it was found that normal saline was just as effective. In addition to the operative procedure in this case there is no question that bi-daily subpectoral infusions of large amounts of saline were very important in saving the patient's life.

A Surgeon: What was the trouble with the first stoma? Why didn't it work?

Dr. Miller: I do not know. I suppose from the appearance of the tissue at the second operation that there was a good deal of edema which made the opening smaller than it was originally made. I think in the second place there was undoubtedly some pulling on the jejunum which kinked it in such a way that there was not a patent opening. Probably there were kinking and edema both. Why the anterior gastro-enterostomy did not work I do not know, unless it was again kinking.

Dr. Freedman: Did they try Sippy's régime?

Dr. Miller: As I remember it he was not put on Sippy's. He was a man who we decided could not be controlled well enough. He was given a diet for duodenal ulcer and did not stick to it. He wanted something done quickly and we thought it was probably just as well to operate at once, so that he could get back to work.

A Physician: Is the recurrence large in cases which have gastro-enterostomy?

Dr. Miller: It is not large. I cannot give the exact figure, but I am sure it is less than 10 per cent. At the Mayo Clinic they have a little more than 90 per cent of cures, so the recurrence must be less than 10 per cent. Gastro-jejunal ulcers are ulcers forming on the wall of the jejunum of the stoma or on the edge of the stoma—they occur in about 2 per cent.

A Physician: What is the accepted diagnosis? Was this case duodenal ulcer?

Dr. Miller: This was duodenal ulcer. Duodenal ulcer in a patient who can afford plenty of time should have medical treatment with Sippy's régime. There is plenty of chance to operate later if they are not cured, and if their symptoms are bad enough. In the majority of cases we do a simple posterior gastro-enterostomy. If the ulcer is on the anterior wall and easy to get at, one may excise it. Most gastric ulcers are on the lesser curvature rather near the pylorus, and often on the posterior wall. Medical treatment of gastric ulcer is, I think, not so satisfactory as that of duodenal ulcer. In the stomach, however, you have to be sure in deciding on the method of treatment that the case is not cancer, and this causes difficulty at times. If you can be sure it is not cancer you can try medical treatment. If you are not sure, give the patient the benefit of the doubt and do at least an exploration. Having made up your mind that you will explore and treat surgically that ulcer, then what you do depends on the patient, on how easy the ulcer is to get up, on your own ability and what you think you can do. It takes a great deal of experience before a person can be facile and dextrous enough with his hands to do skilful gastric surgery. It is not a simple thing to resect a gastric ulcer, but one fairly easy way is to do a V-shaped excision, suture the wall, bringing the cut edges together, and supplement that with a posterior gastro-enterostomy. The reason for doing this is that cutting that wedge out of the lesser curvature interferes with the peristaltic wave of the stomach, and the gastro-enterostomy gives the stomach better drainage. I think most people in the treatment of an ulcer of any size would do a complete resection, that is, remove the pylorus and ulcer-bearing portion of the stomach and then close it up according to one of the three or four common methods. Each case I think has to be treated more or less according to the indications at the time of operation.

As I said, this particular case that we are discussing is very valuable because it teaches that a posterior gastro-enterostomy may fail to function, but that further procedures may be carried out.

DIAGNOSIS

Appendicitis.
Acute duodenal ulcer.
High intestinal obstruction.

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THE AMERICAN COLLEGE OF SURGEONS

The Eighteenth Clinical Congress of the American College of Surgeons will be held in Boston during the week of October 8th through Friday, October 12. Boston is a great medical center with a stimulating past, a wonderful present and a slpendid future. Medical teachers, hospitals, clinical facilities, research laboratories all combine to make the choice of our city as a place of meeting for this Clinical Congress a happy one.

The Committee of Arrangements has painstakingly prepared a splendid program. (See page 695.) Practically all the hospitals of Boston are represented on this program.

It will be well if we refresh our minds as to the activities of the College and learn again in some detail of the work of the Credential Committee in adjudging each candidate for fellowship. We cannot know too much of the Hospital Standardization work initiated and conducted by the College. From the first the College was impelled to this undertaking by the fact that all applicants for fellowship were required to submit as part of their examination a number of their own case reports. These applicants naturally turned to their hospital records only to find, not infrequently, that these records if not altogether wanting were fragmentary and incomplete. This individual demand for case records was the initial incentive to the hospital standardization movement. As the years have passed a hospital standard has been determined upon and is being developed.

The Annual Hospital Standardization Conference will well merit attendance at some if not all of its sessions. Today all hospitals in large and small communities are appealing to the College for its stamp of approval. The hospital authorities realize that those who support hospitals will soon demand that all institutions for the care of the sick meet this standard of efficiency established by the College or be read out of existence. The labor of this work has been enormous—the accomplishment widespread and superb.

The making the academic practical, in the successful publication of the *Journal of Surgery, Gynecology and Obstetrics;* the addition to this *Journal* of the *International Abstract of Surgery;* the organizing of the Clinical Congress of Surgeons of North America in 1910; the founding of the American College of Surgeons in 1913; the amalgamating the Congress and the College in 1917, all these accomplishments, through the initiative of the President-Elect of the American College of Surgeons for this year 1928 are constructive steps in the development of American Surgery.

The movement for the standardization of hospitals has led to international relationships which are important from many angles. Membership in this great Guild of Surgeons is helpful, stimulating and most desirable.

CONFIRMATORY OPINION ON THE STATEMENTS MADE BY DR. GEORGE H. BIGELOW, COMMISSIONER OF HEALTH FOR MASSACHUSETTS

WE note with a pardonable degree of satisfaction that other medical journals make frequent reference to articles published in the JOURNAL, not only in this country but also abroad.

Several references to the paper by Dr. George

H. Bigelow on the subject of "Alcohol Deaths Due to Alcohol" in the issue of March 22, 1928, show that much interest is centered on the effect of the ingestion of alcoholic liquors.

Confirmatory opinions that Ethyl Alcohol is responsible in large measure for the symptoms of poisoning rather than adulterants should help to convince those who are inclined to be intemperate that discretion is the better part of valor in the contest with John Barleycorn.

Like many drugs and foods which are considered useful, alcohol must be regarded as a dangerous plaything as Dr. Bigelow has suggested.

THE PRACTICAL IMPOSSIBILITY OF PREVENTION OF ALL CASES OF TYPHOID FEVER

PHYSICIANS and public health officials ought to be interested in the report of the outbreak of typhoid fever published on page 664 of this issue.

The unusual source of the infection and the expert study and analysis of the factors involved will serve as valuable suggestions to clinicians who may be confronted with cases of continued fever of obscure etiology.

This report shows the quality of service which our Department of Public Health is rendering to the State and should stimulate physicians to seek the co-öperation of this organization in all matters affecting public health problems.

The reference to the failure of the physician to notify the Department of one of these cases suggests the advisability of seeking expert assistance in all cases which may have public health problems.

It is within reason to expect that all febrile conditions in which the diagnosis is not clear to the attending physician should be reported for investigation within a reasonable time.

May it not be that in the future all cases of typhoid fever will be kept under observation until there is no longer danger of communicating the disease?

Although typhoid fever is often spoken of as the vanishing disease it will continue to be in evidence as long as there are food handling carriers.

The Department of Public Health should be given full power to deal with carriers.

ENLARGED THYMUS—A ROENTGENOLOGIST'S VIEWPOINT

ELSEWHERE in this issue of the JOURNAL will be found an original article by Dr. Frederick W. O'Brien on the diagnosis and treatment of enlarged thymus by X-ray. It is timely that we should have this well prepared contribution by a competent roentgenologist because of the present day vogue of X-raying any and all chests for possible thymic enlargement and because of the controversy which exists concerning the importance of this little understood organ.

Medical opinion is divided into two camps over the possible rôle played by the enlarged thymus gland in sudden death following anesthesia, psychic shock, or minor surgery. Confusion exists, on the whole, regarding the enlarged thymus gland per se as a possible pathologic entity and regarding its rôle in so-called status lymphaticus. That these comprise two distinct entities, admitting that they really exist, cannot now be doubted, although much more information must be acquired before their existence and their relationship is established.

Dr. O'Brien has reviewed the literature extensively; both that which regards the thymus gland as a causal factor in sudden death, and that which minimizes or denies its existence. As a result of his literary and his experimental studies he has come to the conclusion that the enlarged gland per se may be regarded as a potential source of danger. Admitting the inadequacy of our knowledge he believes that preoperative X-rays should continue to be taken, and enlarged glands treated until more exact knowledge has given us a different basis on which to act.

His admirable paper serves at least one important purpose; that of emphasizing our lack of knowledge concerning the thymus gland, and consequently stimulating us to continued investigation into its secrets.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

MILLER, JAMES RAGLAN. A.B., M.D. Johns Hopkins 1911. F.A.C.S. Assistant Obstetrician and Gynecologist, Hartford Hospital; Gynecologist, Municipal and Mt. Sinai Hospitals, Hartford, Conn.; Physician-in-Chief, Hartford Dispensary. His subject is: "Caesarean Sections at the Hartford Hospital 1904-1927". Page 651. Address: 179 Allyn Street, Hartford, Conn.

O'BRIEN, FREDERICK W. A.B., M.D. Tufts 1911. Associate Professor of Radiology, Tufts College Medical School; Visiting Roentgenologist, Boston City Hospital, Boston Sanatorium, and Cambridge Municipal Hospital; Visiting Physician, Department of Physical Therapeutics, Boston City Hospital. His subject is:

"The Diagnosis and Treatment of Enlarged Thymus by X-ray". Page 657. Address: 465 Beacon Street, Boston.

JOHNSON, HERBERT L. M.D. Tufts 1914. His subject is: "Amniotic Fluid Concentrate in the Prevention of Adhesions". Page 661. Address: 520 Beacon Street, Boston.

SCAMMAN, CLARENCE L. A.B., M.D. Bowdoin 1909-12; C.P.H. Harvard-Technology School of Public Health 1922. Associate in Public Health Administration, Harvard School of Public Health; Director, Division of Communicable Diseases, Massachusetts Department of Public Health. Address: Room 546, State House, Boston. Associated with him is:

FORSBECK, FILIP C. B.S., M.S., M.D. Rush 1925. Epidemiologist, Massachusetts Department of Health. Address: 546 State House, Boston. They write on "An Outbreak of Typhoid Fever Traced to Corned Beef Infected by a Carrier". Page 664.

FRENCH, JOHN M. M.D. University of Vermont College of Medicine, Burlington, 1877. His subject is: "Why the Thurber Medical Association has Lived for Seventy-Five Years". Page 665. Address: 2 South Main Street, Milford, Mass.

KERR, ROBERT B. M.D. Tufts 1910. Executive Secretary, New Hampshire Tuberculosis Association and Examining Physician to Tuberculosis Clinics in New Hampshire. Physician in charge Pembroke Sanatorium for Tuberculosis; Attending Specialist on Tuberculosis for New Hampshire; For United States Veterans' Bureau; Consultant on Tuberculosis to Hillsborough General Hospital and others in the State. Chairman Tuberculosis Committee New Hampshire Medical Society. His subject is: "Childhood Tuberculosis and Its Relation to the Campaign for the Prevention of the Disease". Page 669. Address: 456 Beech Street, Manchester, N. H.

HOWARD, CHARLES D. S.B. Chemist, New Hampshire Board of Health and Chief, Division Chemistry and Sanitation since 1905. Fellow, American Public Health Association. Member, American Chemical Society and other organizations. Honorary Member New Hampshire Medical Society. Member Federal Joint Committee on Definitions and Standards For Food. His subject is: "Precautions Essential in the Submission of Cadaver Material for Chemical Examination". Page 675. Address: State Board of Health, Concord, New Hampshire.

RUSHMORE, STEPHEN. B.A., M.D. Johns Hopkins 1902. F.A.C.S. Surgeon, Massachusetts Women's Hospital, Boston; Consulting Gynecologist, Symmes Arlington Hospital; Surgeon Gynecological Department, Boston Dispensary. His subject is: "Some Uses of Sugar in Surgery". Page 679. Address: 520 Commonwealth Avenue, Boston.

THE DOCTOR'S SADDLE BAG

THE COST AND QUALITY OF NURSING

THE question of the cost of sickness has been agitated to such an extent that an effort is actually being made to do something about it. We are prone to try and remedy faults which affect our pocketbooks, and sickness (which really ought to be abolished) seems to have reached a stage where it empties the patient's pocketbook without filling the doctor's. At least one happy result can readily be foreseen—we are mutually agreed that some remedy must be sought, and this is the avowed purpose of the Committee on the Cost of Medical Care, whose deliberations have reverberated to some extent, even in the Saddlebag.

While doctor and layman are cogitating upon these problems, however, they must not forget that another large accessory group is equally affected by them and is equally contributory to them. The cost of nursing care constitutes a bunker over which many a conservative family golfer's economic ball fails to rise, even after it has escaped the sandtrap of medical services and the water-hazard of hospitalization. Nursing care cannot be dispensed with in serious sickness and it cannot be adjusted to the average family budget; the nurse, on the other hand, receiving six or seven dollars for a twelve hour day, cannot subsist in common decency and provide for a future of economic independence when we consider that on an average five out of the twelve months are spent in enforced idleness, waiting for cases, recuperating, or working without pay.

This problem, like the larger one of the general cost of medical care, has been investigated during the past two years by the committee on the Grading of Nursing Schools, co-öperatively maintained by the three national nurses' organizations, and by the American Medical Association, the American College of Surgeons, the American Hospital Association, and the American Public Health Association. Cause and effects and remedies are discussed in this report, and the physician who is really interested in the vexing problems of sickness should study these carefully before making his usual complaint that the nursing profession has gone to pot because he can't get his favorite nurse for his favorite patient.

The average income of the registered nurse, we are told, is only $1311 a year, which need not be considered a plutocratic figure for one with her training. To make even this sum, however, she must earn $42 a week for the weeks when she works, the payment of which would make the average wage earner's pocketbook look like the bull who contested the right of way with the Merchants' Limited.

Over-production of nurses with consequent unemployment is a large factor in contributing to the problem, and this goes straight back to the training hospitals which, according to their pol-

icy of securing most of their nursing service at a low cost from pupil nurses, annually graduate some 20,000 girls, or about four for every doctor graduated. True, by no means all of these enter into the competition of private duty. Many among the more capable enter industrial, public health or school work; others find teaching or administrative work in hospitals more congenial to their tastes, and slowly but surely matrimony devastates the ranks. Nevertheless the avidity of the hospitals for cheap labor is the greatest contributing factor in the unemployment of nurses, although in other respects it reacts to the disadvantage of the institutions who deprive their patients of the advantage of skilled nursing.

This same need for a large annual matriculation of pupil nurses tends to lower the standards of the profession by lowering the standards of admission, and as a consequence it has been found that of the nurses graduated within the last five years one-sixth have never been beyond the first year of high school. No profession can hope to maintain a high level of quality if its training is based on a foundation of genuine ignorance, and indeed we have all found this to be too often the case. In the trained nurse we expect to find an appreciation of the fundamentals of pathology and physiology, on which intelligent action can be based. Frequently we find only the darkest ignorance, onto which a superficial bedside technique has been grafted. Sometimes we find the private duty trained nurse to be a conceited, irresponsible person, disloyal to the patient who is employing her and to the physician who is conducting the case, ready to assume responsibilities for which she is unfitted and which have not been asked of her, and suffering in contrast with less trained but more intelligent women who have learned by practical experience how to care for a case and to do it well.

This sounds like an indictment of the nursing profession. It is not one, for no one has a higher regard for its nobility than myself. It is an indictment of the present methods of serving the hospitals to the detriment of the profession. Every profession has its riff-raff and this proportion will be greater in those who do not choose their applicants wisely.

An increased staffing of hospitals with trained nurses and a decrease in the exploitation of training schools to fill this need will result in more opportunities for graduates and a finer selection of pupils. Hospital patients will receive better service, and more economical service, and more opportunities for work will be opened up to graduate nurses if the time of special nurses can be divided. Thus it is perfectly practicable for two patients to share the services of a special nurse, neither of whom would have special nursing if required to assume the burden alone.

Outside of the hospital there is an increasing demand for nursing service by the hour, and this type of service promises to help tremendously in the solution of the private duty problem. It requires organization and executive ability, but it holds forth to the patient the promise of varying degrees of nursing, as needed, at varying rates, and better, because supervised nursing, and to the nurses it holds the promise of steadier employment at salaries which may be dependent on the quality of the service rendered.

MISCELLANY

OCTOBER "TUBERCULOSIS ABSTRACTS"

From The National Tuberculosis Association

When tuberculosis attacks the bones and joints of the child, its devastating effects are unusually cruel. Insidiously and surely, this enemy slows up the child's joyous activity, mars the grace and beauty of its movements, and finally cripples the lithe young body beyond repair. Who can resist the pathos of a Tiny Tim! But a better day dawns. The incidence of bone and joint tuberculosis is undoubtedly lessening. How much credit for this is due to the better production and pasteurization of milk is not altogether apparent, but surely it is considerable. However, in this country, by far the larger proportion of cases have been caused by the human type of tubercle bacillus. Moreover, methods of treatment are more effective. Surgery, valuable but no longer the sole reliance, is now being supplemented by general treatment in open air institutions, by heliotherapy and other means. Rollier has given us an entirely new conception of methods of treatment and Humphries states: "In cases of surgical tuberculosis, it is difficult to restrain one's enthusiasm when speaking of heliotherapy or to refrain from quoting cases which would read as do the miracles." Tuberculosis of the joints and bones is still common and serious enough to warrant the most careful attention of every practitioner. Best results in treatment are attained through the co-öperation of the physician and the surgeon. The various forms of light therapy are not to be applied hit or miss. They can work harm, and should always be administered under skilled and experienced direction.

BONE TUBERCULOSIS A CHILDREN'S DISEASE

Tuberculosis of the joints is principally a disease of children. More than 85% of all cases, says Ritter, occur in children from two to ten years, and more than 50% at from two to five years. The disease involves the spine in about 40% of all cases, the hip in 30% and the knee in 20%. Tuberculous dactylitis, or disease of a finger joint, is not infrequent and should not be overlooked.—*Handbook of Tuberculosis for Medical Students and Practitioners of Medicine, John Ritter, M.D.*

PATHOLOGY OF JOINT TUBERCULOSIS

Bone and joint tuberculosis is secondary to tuberculosis of some other part of the body. The bone is attacked first and then the joints. The process usually starts on the joint side of the epiphyseal line. The factors responsible for this are: end arteries, poor circulation and traumatic injury.

The diseased area or focus may be encapsulated

and eventually heal, or lie dormant, perhaps breaking out anew at some future time as the result of trauma. Caseation often results, and then the disease may spread to the joint through the cartilage, or to the synovial membrane. Destruction of the joint structures follows. So-called cold abscesses and fistulous tracts are formed if the disease breaks through the bones and joint. Secondary infection, especially with the staphylococcus, sometimes occurs by way of the fistulous opening and may hasten the destructive process.

There is very little attempt at new bone formation. Healing takes place by calcification, encapsulation and cicatrization. Deformities, atrophy and contractures commonly occur.—*Surgical Treatment of Tuberculosis of Bones and Joints. E. J. Cummings, M.D., Texas State Jour. of Med., Nov., 1927.*

DETECTING JOINT TUBERCULOSIS

Berkheiser stresses the important etiological causes of tuberculosis of the bones and joints as follows: Contact with active tuberculosis, especially in the home. The younger the child, the greater the liability to bone involvement. Trauma is certainly an important factor. Most of the cases occur in the joints which have the widest range of motion, while the joints which are less mobile and hence less frequently traumatized seldom become involved.

Among the prodromal signs, it is noticed that the child is inactive and not inclined to play strenuous games with the other children as heretofore. The child often develops anemia; the appetite is not good; he gradually loses weight, and this results in a drawn appearance.

The important subjective symptoms are: (a) stiffness of the joint and (b) pain on movement of the joint locally, though the greater pain is often referred along the course of the nerve to some distant point. Gradual slight change in gait, due to unconscious protection of the joint, and night cries on account of muscular relaxation are important symptoms.

The objective findings are those of a chronic synovitis, as: (a) swelling which is uniform, obliterating the bony landmarks of the joint; (b) atrophy of the adjacent muscles, due to disuse and proportional to the duration of the disease; (c) deformity in varying degrees because of the bone destruction and resulting angulation of the articular surfaces.*

The differential diagnosis is of as much importance as the essential diagnosis. All the conditions which cause pain or deformity of the hip must be ruled out, as follows:

1. Acute epiphysitis, acute osteomyelitis, especially of the femur, and acute septic arthritis. These concurrent diseases usually occur in young individuals who have had some of the acute exanthemata; acute tonsillitis, furunculosis or sepsis in some of the other bones or joints.

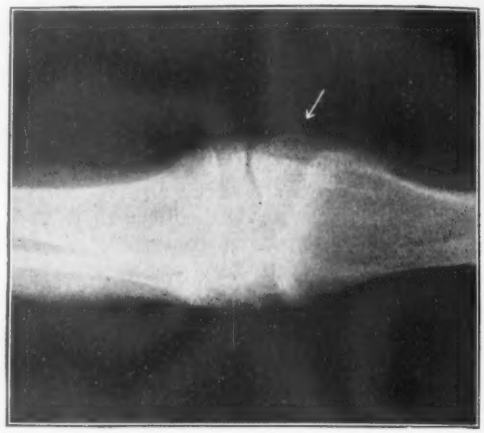
2. Perthes' disease, or osteo-chrondritis deformans juvenalis, the symptoms of which are very similar to tuberculosis except that in this condition there is less stiffness, less atrophy and less tendency to deformity. The X-ray reveals that the head of the femur is flattened and later segmented, while the neck of the femur becomes broader.

3. Idiopathic coxa vara occurs usually in fat boys, who at puberty have a disturbance of the glands of internal secretion and do not develop the secondary sexual characteristics.

4. Congenital dislocation of the hip, in which there is a history of a painless limp which has been present since the child started to walk.

5. Sciatica, with its pain referred down the nerve, especially when the nerve is stretched by extending the flexed knee on the thigh, which is held flexed.

6. Sacro-iliac disease, in which there is a tilting of the body away from the affected side and a limp due to the restricted motion at the hip.



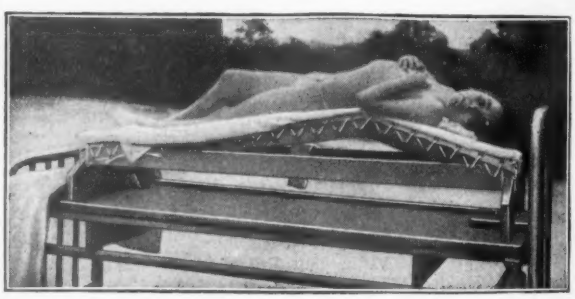
TUBERCULOSIS OF KNEE JOINT.

Courtesy Maxwell Harlin, M.D., Lakeside Hospital, Cleveland, Ohio.

7. Pott's disease of the lumbar region, with the psoas abscess which causes a flexion of the thigh and restriction of extension, while all other movements of the hip are free. With Pott's disease, there is stiffness of the back, an angular kyphosis, and X-rays reveal destruction of the bodies of the vertebrae.—*Diagnosis of Tuberculosis of the Bones and Joints, E. J. Berkheiser, M.D., Bul. of the City of Chicago Muni. Tuber. San., June, 1925.*

TREATMENT OF POTT'S DISEASE

The large number of failures from operations upon Pott's disease justifies a modified procedure. The child (under ten years of age) with Pott's disease should be placed on a Bradford frame and



MODIFIED BRADFORD FRAME.

Courtesy Clarence L. Hyde, M.D., Springfield Lake Sanatorium, East Akron, Ohio.

kept there "in absolute recumbency until bony union of the diseased vertebrae is clearly demonstrated by the X-ray." Fourteen children under the age of ten years were selected as nearly as possible in pairs

*The author is describing the later manifestations. Early symptoms are not pronounced; in fact, the local changes may be so slight as to be overlooked.

as regarded amount of disease, size and general condition, and all put on Bradford frames. From each pair, one was operated upon (Hibbs type of fusion) and returned to the frame, and one was kept in prolonged recumbency on the frame. From time to time, children in both groups who were clinically free from symptoms were allowed to get up and wear braces, but such experiences always led to a recurrence of symptoms unless there was in the X-ray "a continuous firm bony bridge uniting the diseased vertebrae, and the disappearance of all signs of rarefaction between them." This means permanent cure. Of the 14 children, 13 are well and active; the kyphos in 11 is so small as to be of no importance. It appears that the cure of this disease in children depends principally upon long-continued rest without weight-bearing; that cases in which fusion (by operation) has been done require the same careful treatment as do those without operation; that unoperated ones have more flexible spines than operated ones. — *Comparative Results of Operative and Non-Operative Methods of Treatment of Tuberculosis of the Spine in Children. F. C. Kidner and F. Muro, J. Bone & Joint Surg., Oct., 1927, ix (o. s., xxv), 649.*

SIX CHIROPRACTORS PROSECUTED

On September 13, 1928, the district court in Holyoke found Ernest S. Grandchamp, N. L. Boissy and John D. Griswold guilty on counts alleging that they held themselves out as practitioners of medicine and had practiced medicine and they were fined $100 each. Marie Theissl and John B. Walsh were found guilty, the count alleging that they held themselves out as practitioners of medicine, and were fined $100 each. C. Guy Belaire pleaded guilty and final disposition of his case was postponed because of the statement that he had suspended practice. The others appealed.

The cases were presented by Frank R. Sanborn, State Inspector, who swore out the warrants, and he was the sole witness, basing his testimony on evidence found in the offices of the defendants. An attorney representing the National Chiropractors Association assisted local attorneys in defending the chiropractors.

SPECIAL NOTICE

CLINICAL CONGRESS OF AMERICAN COLLEGE OF SURGEONS

George D. Stewart, New York, President.
Franklin H. Martin, Chicago, Director-General.

The Complete Program for the 1928 Clinical Congress in Boston has been printed and may be obtained by application to Dr. Charles G. Mixter, Secretary.

The surgeons of Boston have prepared and will present a highly attractive program of clinics and demonstrations in the hospitals and medical schools of this city during the eighteenth annual Clinical Congress of the American College of Surgeons, beginning Monday, October 8th, and continuing through Friday, October 12th. The clinical program will completely represent the clinical activities of this great medical center in all departments of surgery. A schedule of clinics and demonstrations has been prepared by the Committee on Arrangements, under the leadership of Dr. Frederic J. Cotton, Chairman. The real clinical program of the Congress will be issued daily and may be obtained at the headquarters at the Statler Hotel which will be open for registration at 8 o'clock, October 8. The ballroom of the Copley-Plaza Hotel will be utilized for evening meetings, hospital conferences, the annual meeting and other large gatherings. Printed programs will be distributed each morning.

For ophthalmologists and otolaryngologists, the Committee has prepared, in addition to clinics and demonstrations during the morning hours of each day, a series of clinical demonstrations and conferences on Tuesday, Thursday and Friday afternoons to be presented in the Georgian Room at the Statler Hotel. On Wednesday afternoon in the same room a symposium dealing with the principles involved in the standardization of eye, ear, nose and throat departments in general hospitals will be presented.

A special feature of this year's meeting will be the showing of several surgical films that have been produced under the supervision of and approved by the American College of Surgeons. A number of such films will be given their premier showing at Boston. In addition, it is planned to show a number of surgical films that have been made in England and France.

A feature of the Boston meeting that will be of interest to all surgeons will be the celebration of Ether Day at the Massachusetts General Hospital on Friday. Exercises will be held at 11 o'clock in the dome room of the old building of the hospital where ether was first administered for the production of surgical anaesthesia on October 16, 1846. On this occasion a bronze bust of William T. G. Morton will be presented to the hospital.

In addition to those surgeons from abroad, whose names appear in the program for the evening meetings, there will be present at this year's Congress a number of distinguished surgeons from various parts of the world including: Sir George A. Syme, of Malvern, Australia, President of the Australasian College of Surgeons; George E. Waugh, Thomas P. Dunhill, and Percy T. Hughes, of London, England; T. de Martel, of Paris, France; Charles G. F. Morice, of Wellington, New Zealand; Farquhar Macrae, of Glasgow, Scotland; Daniel J. Cranwell, of Buenos Aires, Argentina; Louis L. Cassidy and Charles J. MacAuley, of Dublin, Ireland; Ulises Valdes and Rafael Reygades, of Mexico City, Mexico.

EVENING MEETINGS

The general program as prepared by the executive committee includes evening sessions on each of the five days of the Congress. The complete program for these evening sessions is as follows:

Presidential Meeting, Monday, October 8—Symphony Hall, 8:15 P. M.

Address of Welcome: Frederic J. Cotton, M.D., Boston, Chairman of Committee on Arrangements.
Address of Retiring President: George David Stewart, M.D., New York.
Introduction of Foreign Guests.
Inaugural Address: The Evolution of Clinical Medicine and Surgery in Relation to the Preservation of Health and Life. Franklin H. Martin, M.D., Chicago.

The John B. Murphy Oration in Surgery: Malignant Bone Tumors. Professor Vittorio Putti, Bologna, Italy.

Tuesday, October 9—Ballroom, Copley-Plaza Hotel, 8:15 P. M.

Hunterian Oration: Grand Curiosity, Sir Squire Sprigge, M.D., B.Ch., F.R.C.S., London.

Symposium: Ureteral Transplantation.

Robert C. Coffey, M.D., Portland, Oregon: Transplantation of Ureters into the Large Bowel.

Charles M. McKenna, M.D., Chicago: End-Results in Transplantation of Ureters.

Arthur H. Curtis, M.D., Chicago: Notes on (1) Management of Ureteral Injuries; (2) Surgical Indications in Patients Who Require Ureteral Transplants.

Charles H. Mayo, M.D., Rochester, Minn.: Contributing Causes of Genito-Urinary Anomalies.

Discussion: George Gilbert Smith, M.D., and William Carter Quinby, M.D., Boston.

Wednesday, October 10—Ballroom, Copley-Plaza Hotel, 8:30 P. M.

Special Meeting of the Boston Surgical Society: Presentation of the Henry J. Bigelow Medal.

Chevalier Jackson, M.D., Philadelphia: Bronchoscopy—Past, Present, and Future.

Thursday, October 11—Ballroom, Copley-Plaza Hotel, 8:15 P. M.

Professor Archibald Young, M.B., C.M., F.R.F.P.S., Glasgow: Sacrococcygeal Chordoma.

Sir Charles Ballance, K.C.M.G., C.B., M.V.O., London: Some Thoughts on the Nature of Cancer.

George W. Crile, M.D., Cleveland: The Adrenal Factor in Hyperthyroidism.

Colonel Sir John Lynn-Thomas, K.B.E., C.M.G., C.B., F.R.C.S., Llechryd, Wales: Motion pictures on orthopedic subjects, with introductory remarks.

Convocation, Friday, October 12—Symphony Hall, 8:15 P. M.

Conferring of Honorary Fellowships.

Presentation of Candidates for Fellowship.

Presidential Address: The American College of Surgeons—the Past, the Present, and the Future. Franklin H. Martin, M.D., Chicago.

Fellowship Address: The Education of the Surgeon. William J. Mayo, M.D., Rochester, Minnesota.

OPEN FORUM AND SYMPOSIUM ON TRAUMATIC SURGERY

An open forum on traumatic surgery has been planned for Friday morning at the Copley-Plaza Hotel beginning at 10 o'clock; and in the afternoon at 2 o'clock a more formal presentation of the subject, at which time papers will be presented without open discussion. For the morning session a number of subjects have been selected and men chosen to give five-minute talks thereon, following which there will be a general discussion. The program for the open forum is as follows:

Loyal A. Shoudy, M.D., Bethlehem, Pa.: What Relation Should Exist between an Industrial Medical Department and the Other Executives of the Industry?

Fred G. Hughes, Bristol, Conn.: What Are the Essential Features in the Physical Equipment of an Industrial Medical Department? (Illustrated.)

A. D. Lazenby, M.D., Baltimore, Md.: How Can Economies Be Introduced in the Care of the Injured?

Donald A. Guthrie, M.D., Sayre, Pa.: What Are the Advantages and Methods of Supervision of Traumatic Surgery in a Hospital?

Donald B. Cragin, M.D., Hartford, Conn.: What Is the Place of Physical Therapy in the Care of the Injured?

Earl W. Williamson, M.D., Chicago: What Are Some of the Defects in the Organization for Care of the Injured, as Seen in a Large City?

The following program for the symposium in the afternoon has been prepared:

Frederic A. Besley, M.D., Chicago, Chairman, Professor of Surgery, Northwestern University Medical School: Report of Board on Traumatic Surgery.

Irving S. Cutter, M.D., Chicago, Dean, Northwestern University Medical School: Traumatic Surgery as an Educational Problem.

John P. Frey, Washington, D. C., American Federation of Labor: The Relation of Organized Labor to the Care of Accidents.

Lindsay Rogers, Ph.D., LL.D., New York, Professor of Public Law, Columbia University: Some Aspects of the Medical Situation under the New York Workmen's Compensation Act.

Thomas P. Henry, President of American Automobile Association: The Care of Injuries, from the Standpoint of the Motorist.

David Beyer, Boston, Director of National Safety Council: Prevention of Accidents.

In connection with the meetings on Friday dealing with various aspects of traumatic surgery, it is important to note that a series of clinics in industrial surgery has been prepared for each afternoon to be held in the medical department of the American Mutual Liability Insurance Company. A detailed schedule of these clinics will be found in the preliminary clinical program.

ANNUAL MEETING

The annual meeting of the Fellows of the College will be held at 2 o'clock on Thursday afternoon in the ballroom of the Copley-Plaza Hotel; reports of officers and standing committees will be presented and officers elected for the ensuing year.

Following the annual meeting there will be presented a symposium on the "Treatment of Malignant Diseases with Radium and X-ray," which will include a special report on the treatment of cancer of the breast. The complete program for this session appears on another page.

HOSPITAL CONFERENCE

The eleventh annual hospital conference of the American College of Surgeons opens on Monday morning at 10 o'clock with a session in the ballroom of the Copley-Plaza Hotel. The program for the hospital conference calls for morning and afternoon sessions in the same room on the following days.

A special session on Wednesday afternoon will be of particular interest to those whose practice is confined to surgery of the eye, ear, nose and throat.

During the Clincal Congress there will be a meeting of hospital record librarians to be held at the Copley-Plaza Hotel.

The hospital conference program is planned to interest not only surgeons but also hospital trustees, executives and personnel generally, and an invitation to attend is extended to all persons who are interested in hospital activities.

LIMITED ATTENDANCE—ADVANCE REGISTRATION

Attendance at the Boston session will be limited to a number that can be comfortably accommodated at the clinics, the limit of attendance being based upon the result of a survey of the amphitheaters, operating rooms, and laboratories in the hospitals

and medical schools as to their capacity for accommodating visitors. Under this plan it will be necessary for those who wish to attend to register in advance.

Attendance at clinics and demonstrations will be controlled by means of special clinic tickets, which plan has proved an efficient means of providing for the distribution of visiting surgeons among the several clinics and insures against overcrowding, the number of tickets issued for any clinic being limited to the capacity of the room assigned to that clinic.

CANCER SYMPOSIUM

Thursday, October 11—Ballroom, Copley-Plaza Hotel, 3:30 P. M.

Robert B. Greenough, M.D., Boston (Chairman of the Committee on the Treatment of Malignant Diseases with Radium and X-ray): Report of the Committee.

James F. Percy, M.D., Los Angeles: Statistical Report of Cautery Surgery in Uterine Cases.

George Gray Ward, M.D., New York: Radium Therapy in Carcinoma of the Cervix Uteri.

Walter E. Sistrunk, M.D., Rochester, Minn.: Criteria of Malignancy in Cancer of the Breast.

George W. Holmes, M.D., Boston: Results of X-ray Treatment in Cases of Cancer of the Breast.

Clinical Program

GENERAL SURGERY, GYNECOLOGY, OBSTETRICS, UROLOGY, ORTHOPEDICS

Boston City Hospital

Monday, 2 P. M. Gynecological and obstetrical operations and demonstration of cases.

Tuesday forenoon beginning at 9 A. M. General surgical operations.
Afternoon at 2 P. M. Dry clinic: Perforated ulcers of the stomach and duodenum.
2:25 Intussusception of the bowel occurring within the stomach following gastro-enterostomy.
2:50 Thoracoplasty for bronchiectasis; series of fractures.
3:15 Surgical aspects of some tropical maladies.
3:40 Postoperative hernias.
3:55 Care of the surgical diabetic.
4:15 Menacing ovarian haemorrhage in acute abdominal surgery; total subperiosteal resection of the tibia with preservation of both epiphyses and complete function of ankle and knee.

Wednesday forenoon, 9 A. M. General surgical operations.
Afternoon at 2 P. M. Dry clinic: The influence of changes in the basal metabolism on the action of morphine.
2:25 Demonstration of thyroid cases at Boston City Hospital during the past year.
2:50 Demonstration of series of cases of undescended testicle.
3:15 End-results in gall-bladder surgery.
3:45 Nephropexy for kinked ureters with lantern slides of pre- and postoperative conditions.
4:05 Review of cases of intestinal obstruction complicating convalescence of acute appendicitis.

Thursday, 9 A. M. General surgical operations.
2 P. M. Dry clinic: Appendicitis in children.
2:25 Dry clinic: Hip fractures; "fender fracture" of knee; arthroplasty of knee; elbow dislocation with ulnar nerve lesion; fourth class of ankle fracture.
2:50 Dry clinic: Drainage of septic joints; subastragaloid arthrodeses of fractured os calces; late suture of severed ulnar nerve.
3:10 Dry clinic: Several cases of open reductions and fixations of fractured tibia under spinal anaesthesia with Pitkins solution; convalescing case of osteomyelitis of ilium with haemolytic streptococcus septicaemia.
3:25 Fracture of cervical spine; fractional section of the root of fifth nerve for major neuralgia.
3:45 Mechanism of hydrocephalus.
4:05 Diverticulum of the bladder; three cases of carcinoma of the bladder.

Friday, 9 A. M. Conferences and presentation of special subjects.
Hip fractures.
Impaction in hip fractures.
Pathology of bone lesions.
Fractures of os calcis.
Lesions of the large bowel.
Carpal injuries.
Scaphoid fractures.
Position in treatment of scaphoid fractures.

Long Island Hospital

Monday, 2 P. M. Genito-urinary clinic, operations and demonstration of cases.
The use of surgical diathermy in cancer of the tongue and mouth.
Surgical Pathology.
Neurosurgical features pertaining to surgery.
Surgical X-ray demonstration.

Wednesday, 2 P. M. Orthopedic clinic, operations and demonstration of cases; traction in the treatment of fractures; treatment of congenital hip.
Surgical Pathology.
Neurosurgical features pertaining to surgery.
Surgical X-ray demonstration.
Injection treatment of varicose veins; operations and demonstration of cases.

Friday, 2 P. M. Genito-urinary operations.
Orthopedic operations.
General surgical operations.
Surgical pathology.
Neurosurgical features pertaining to surgery.
Surgical X-ray demonstration.

Massachusetts General Hospital

Monday, 2 P. M. Dry clinics:
Tuberculosis of the knee.
Tuberculosis of the spine.
Tuberculosis of the sacro-iliac.
Internal derangements of the knee.
Congenital dislocation of the hip.
Thyroid clinic.
3:00 Observations of burns.
3:30 The heart in surgery.
4:00 Fascial repair of hernia.
Surgical laboratories open from 2 to 4.

Tuesday, 9 A. M. Genito-urinary clinic, operations and demonstration of cases.
Surgical Staff—11. General surgical operations and demonstration of cases.

Tuesday, 2 P. M. Surgery of the nervous system, operations and demonstrations.
Cancer of the colon and rectum.
3:00 Spinal anaesthesia.
3:30 X-ray burns.
4:00 Uterine bleeding.
4:30 Circulatory diseases of the extremities.
2:00 Demonstrations in surgical research laboratories.
3:00 "Cabot Clinic" (pathology).

Wednesday, 9 A. M. General surgical operations.
12:00 Plastic surgery.
2:00 P. M. Thoracic surgery, operations and demonstration of cases.
Social Service.
3:00 Syphilis in surgery.
3:30 Tendon and Nerve Sutures.
4:15 Psychiatry and surgery.
Surgical laboratories open for inspection from 2 to 4.

Thursday, Orthopedic Service. 9 A. M. Operations and demonstrations.
Arthritis of the spine.
Arthritis of the knee.
Arthritis of the hip.
Poliomyelitis.
End-result studies.
2:00 P. M. Demonstration of cases.
Surgery of the spleen.
2:30 Hernia through the cardiac orifice of the diaphragm.
Staff—2:00 P. M. Demonstrations in surgical research laboratories.
2:30 Surgical tuberculosis; cervical adenitis.
3:00 Cancer of the caecum; the duodenum and common bile duct.
4:30 Plastic surgery.

Friday, "Ether Day Celebration" 11 A. M. Presentation of bust of Dr. W. T. G. Morton by the Associated Anaesthetists of the United States and Canada and the International Research Society.

Robert B. Greenough, C. C. Simmons and associates 2 P. M. Tumor clinic.

George Holmes and associates 3 P. M. X-ray and surgery.

Peter Bent Brigham Hospital

Monday, 2:30 P. M. Neurosurgical clinic.
3:30 Diverticulitis.

4:00 Passing of the chronic appendix.
4:30 Study of the results of medical and surgical treatment of peptic ulcer.

Tuesday, 9:30 A. M. Surgical operations.
2:30 P. M. Medical diagnostic and therapeutic clinic.
3:30 Cordotomy for the relief of pain.
4:00 Hypertension and nephritis in relation to surgery.
4:30 Surgical diagnostic clinic.

Wednesday Staff, 9:30 A. M. Surgical Operations.
2:30 P. M. X-ray study of massive atelectasis of the lung.
3:00 Effect of drugs on the nitrogen metabolism.
3:30 Treatment of varicose ulcer.
4:00 Heart disease in surgery.
4:30 Demonstration in surgical pathology.

Thursday, 9:30 A. M. Surgical operations.
2:30 P. M. Surgical clinic.
3:00 Insulin in surgical conditions.
3:30 Treatment of secondary anaemia by liver diet.
4:00 Pituitary gland and its influence on growth.

Boston Dispensary

Tuesday, 2 P. M. Lipiodol injections in the diagnosis of bronchiectasis and lung abscess.
Cystoscopy and demonstration of cases.
Dry clinic, importance of the physician to the surgeon, illustrated by cases.

Wednesday, 11 A. M. Orthopedic operations.
11:00 Injection treatment of varicose veins; demonstration of technique, cases and pathological specimens.
Demonstration of malignancies treated by radium and X-ray therapy.

Thursday, 2 P. M. Treatment of gonorrhoea in women.
2:00 Hinton-cholesterol reaction; demonstration of technique and relative sensibility.
Surgical aspects of pyloric stenosis in infants.

Harvard Medical School

Tuesday and Wednesday, 2 P. M. Haematological studies with special reference to splenectomy in children.
Studies of injuries to the spinal cord in infants.
Infantile paralysis: modes of spread, use of convalescent serum, experiments in immunity, and epidemiology of the disease.
Complete denervation of heart; effects of total sympathectomy.
Cancer, the use of high frequency currents.
New colloid solutions for intravenous injections as substitutes for simple salt solutions.
Microscopic demonstration of capillary injection of the brain.
Demonstration of the cerebral circulation in living cats.

The new electrophysiology center will be open for inspection to any who are interested in the physiology of the nervous system.

Thorndike Memorial—Boston City Hospital

Tuesday and Thursday, 2:30 P. M. Treatment of pernicious anaemia.
Epilepsy; capillary circulation; achylia gastrica; anemia and disorders of the blood; cardiovascular diseases; metabolism; bacteriology.
Demonstration of certain tumors of parasitic origin.
New methods of artificial respiration.

Surgical Laboratory—Massachusetts General Hospital

Tuesday and Thursday, 2 P. M. Experimental problems in connection with intestinal obstruction.
Subject to be announced.
Circulatory disorders of the extremities.

Massachusetts General Hospital

Wednesday, 9 A. M. Studies on the physiology of muscular work in health and disease.
Investigations in calcium metabolism bearing on bone growth and repair.
Studies on thyroid disease; iodine dosage in exophthalmic goiter, thyroxin in myxoedema.
Acid and base secretions by the stomach; references of pain from the gastro-intestinal tract.

Warren Museum

Open daily from 2 to 4 P. M.

Demonstrations:
Dwight collections of spines illustrating deformities, anomalies, diseases.
Bone tumors, with X-ray, histories, and microscopic slides and miscroscopes available for examination. Some of these specimens were used in the illustrations in the monograph on "Bone Sarcoma" issued by the American College of Surgeons.
Models showing various types of club feet and effects of operation.
The pictures in Dr. Nichols' collection illustrating pathological conditions of bone.
Fractures and dislocations of bones as they existed before industrial plants provided so many safeguards.
Tuberculosis of bones and joints.
Syphilis of bones.
Dislocation of ends of bones.
Collection of old surgical instruments, obstetrical forceps, turn keys for extracting teeth, urological tools, cupping and leeching instruments.

Huntington Memorial Hospital

Wednesday, 2 P. M. Dry Clinics. Carcinoma of the skin.
Cancer of the tongue and buccal mucosa.
Carcinoma of the cervix.
Varying degrees of malignancy in cancer.
Cancer of the rectum.
Cancer of the antrum and accessory sinuses.

Thursday, 2 P. M. Dry clinics. The modern X-ray plant.
Cancer of the lip.
Carcinoma of the genito-urinary tract.
Carcinoma of the breast.
Malignant bone tumors.
Electrocoagulation in the treatment of malignant disease.

New England Deaconess Hospital

9 A. M. daily. General surgical clinic, operations and demonstration of cases.
2 P. M. daily. Dry clinic: Cancer of the large intestine; surgery of diabetics.
2:30 P. M. daily. Treatment of the surgical diabetic; diabetes and hyperthyroidism.
3 P. M. daily. Dry clinic: Oesophageal diverticulum; heart failure and hyperthyroidism; cancer of the thyroid; fascial sutures in hernia repair; thyroid crises.
3:40 P. M. daily. Indications for surgery in peptic ulcer.
3:50 P. M. daily. Cardiac conditions complicating surgery.
4 P. M. daily. X-ray demonstrations, diagnosis and therapeusis.

Forsyth Dental Infirmary

Staff 2 P. M. daily. Surgical clinics, cleft palate operations, root resections.
Demonstrations in research laboratories; effect of various diets on bone development and repair.

Free Hospital for Women

Monday, 2 P. M. Dry clinic: Gynecological pathology, demonstration of specimens and slides.

Tuesday, 9 A. M. Gynecological operations: Amputation of cervix and coeliotomy (first state procidentia); perineorrhaphy (second stage procidentia); hysterectomy for fibroid; dilatation and curettage, coeliotomy for retroversion.

Wednesday, 9 A. M. Gynecological operations: Plastic coeliotomy (reconstruction operation); hysterectomy for fibroid; dilatation and curettage, coeliotomy for retroversion; perineorrhaphy for complete laceration for perineum.

Thursday, 9 A. M. Gynecological operations: Amputation of cervix and coeliotomy for procidentia; plastic and coeliotomy for prolapse (reconstruction operation); hysterectomy for fibroid; closure of vesicovaginal fistula.

Friday, 9 A. M. Gynecological operations: Hysterectomy for cancer; dilatation and curettage and application of radium for cancer. Dry clinic: Demonstration of cancer cases treated.

Carney Hospital

Monday, 2 P. M. Dry clinic: Traumatic injuries of the hip joint, illustrated.
Dry clinic: Fractures of the femoral shaft and of the table of tibia; wrist joint arthroplasties.
Dry clinic: Radical operations for carcinoma of the breast and perforating duodenal ulcer, with presentation of cases.

Tuesday, 9 A. M. Surgical operations.
Gynecological and obstetrical operations.
2:00 P. M. Dry clinic: Ununited fracture of neck of femur; bone screws in fractures; fusion of spine.
Dry clinic: chronic duodenal ulcer.
Dry clinic: End-results following interposition operation for uterine prolapse (lantern slides).

Wednesday, 9 A. M. General surgical operations.
Gynecological and obstetrical operations.

2 P. M. Dry clinic: Relative value of various types of operative bone splinting, including the massive bone graft; treatment of chronic arthritis of the spine, operative and non-operative; incidence, recognition and treatment of spondylolisthesis; over-correction of deformities in fractures.
Dry clinic: Caecostomy in acute appendicitis with peritonitis, presentation of cases.
Dry clinic: The low or cervical caesarean section (lantern slides).

Thursday, 9 A. M. General surgical operations.
Gynecological and obstetrical operations.
2 P. M. Dry clinic: Mobilization of the knee and elbow.
Dry clinic: Scoliosis and club foot.
Dry clinic: Postoperative medical problems; pre-operative treatment in cardiac cases.
Dry clinic: Uterine bleeding (lantern slides).

Friday, 9 A. M. General surgical operations.
Gynecological and obstetrical operations.
2 P. M. Orthopedic clinic.
Dry clinic: Intestinal parasites in immigrants.
Dry clinic: Fractures and injuries of hand and forearm; presentation of special splints.
Dry clinic: Appendicitis and pregnancy.

Robert Brigham Hospital

Tuesday, 2 P. M. Focal infection in chronic arthritis; gastro-intestinal studies.
3 P. M. Types of arthritis with X-ray studies and orthopedic principles in the treatment.

Wednesday, 2 P. M. Operation for knee deformities.
3:00 Demonstration of orthopedic apparatus.

Thursday, 2 P. M. Circulatory conditions in arthritis.
3:00 Mechanical conditions of the low back.

Friday, 2 P. M. Orthopedic operations and demonstration of cases; orthopedic principles in the treatment of chronic arthritis.

Cambridge Hospital

Tuesday—Staff 9 A. M. General surgical clinics, operations and demonstration of cases.

Wednesday, 9 A. M. Orthopedic clinic, operations and demonstration of cases.

Friday, 9 A. M. General surgical clinics, operations and demonstration of cases.

Massachusetts Homeopathic Hospital

Monday, 2 P. M. General surgical clinic: Operations and demonstration of cases.

Tuesday, 9 A. M. Surgical operations.
9:00 Urological operations.
10:00 X-ray demonstration.
10:00 Gynecological clinic.
2 P. M. General surgical operations.

Wednesday, 9 A. M. Surgical operations.
9:00 Orthopedic operations.
2 P. M. Surgical operations.
2:00 Bronchoscopic clinic.

Thursday, 9 A. M. Surgical operations.
10:00 Gynecological clinic.
X-ray demonstration.
2 P. M. Surgical operations.

Friday, 9 A. M. Surgical operations.
2 P. M. Surgical operations.

St. Elizabeth's Hospital

Tuesday, 9 A. M. Surgical clinic.
2 P. M. Dry clinic: Genito-urinary cases, end-results and unusual roentgenograms.
Gynecological examinations.
Cases of cancer of cervix; operation and X-ray therapy, one to four years after operation.
Postoperative hypospadias.

Wednesday, 9 A. M. Surgical clinic: Appendectomy; cholecystectomy.
2 P. M. Dry clinic.

Thursday, 9 A. M. Surgical clinic: Spinal fusion.
2 P. M. Dry clinic: Hour-glass stomach; fibroma of colon, with intermittent intussusception; carcinoma of appendix.
Surgical cases.

Friday, 9 A. M. Surgical clinic: Appendectomy; cholecystectomy.

New England Hospital for Women and Children

Tuesday, 9 A. M. Gynecological operations.

Wednesday, 9 A. M. Demonstration of unusual obstetrical cases; and Gynecological operations.

Thursday, 9 A. M. Demonstration of postoperative cases; pathological specimens and borderline cases.

Clinics on Industrial Surgery

At these clinics, to be held in the office of the Medical Director of the American Mutual Liability Insurance Company, cases will be shown to illustrate diagnosis, treatment and end-results.

Tuesday, 2 P. M. Shoulder injuries.
4:00 Inguinal pain without hernia.

Wednesday, 2 P. M. Reconstruction surgery in industry.
4:00 Injuries to the back.

Thursday, 2 P. M. Fractures of the os calcis; injuries to the knee.
4:00 Industrial dermatology.

Friday, 2 P. M. Fracture of the skull.
3:00 Industrial neurology.
4:00 Hernia.

Palmer Memorial Hospital

Tuesday—Staff 2 P. M. Deep X-ray therapy clinic; demonstration of prevention of peritoneal adhesions; pathological demonstration.
2:00 Prevention of peritoneal adhesions by amniotic fluid; experimental and clinical results.

Wednesday—Staff 9 A. M. Operations illustrating treatment of various types of malignancy.

Thursday, 2 P. M. Follow-up and radium clinics, general surgery.
2:00 Prevention of peritoneal adhesions by amniotic fluid; experimental and clinical results.

Friday, 2 P. M. Follow-up and radium clinics, gynecology.

Children's Hospital

Monday, 2 P. M. Fracture conference, combined surgical and orthopedic services.

Tuesday, 9 A. M. Surgical staff. General surgical operations followed by dry clinic.
Hare lip and cleft palate.
Contractures and plastics.
Angiomata.
Medical aspects of empyema and lung abscess.
2 P. M. Dry clinic, infantile paralysis and epidemiology, occurrence, serum treatment.
Demonstration of apparatus for prevention of deformity in early cases.
Muscle training.
Tendon transplantation.
Stabilizing operations.
Operations.
Moving pictures.

Wednesday, 9 A. M. Combined cilnic of surgical and orthopedic services, present policies in the treatment of glandular, intra-abdominal, bone, and joint tuberculosis.
2 P. M. Combined clinic of surgical and orthopedic services, osteomyelitis, acute, chronic, circumscribed; Brodie's abscess; septic joints; types of infection and treatment.

Thursday, Orthopedic staff, 9 A. M. Dry clinic.
Conference on obstetrical paralysis with lantern slides and moving pictures and spastic palsy.
Muscle training.
Stoeffel operation.
2 P. M. General surgical operations followed by dry clinic.
Urinary obstruction and infection.
Kidney stone.
Hernia and undescended testicle.
Kidney tumors, pathological aspects.

Friday, Surgical Staff, 9 A. M. General surgical clinic.
Orthopedic Staff 2 P. M. Dry Clinic.
Conference on torticollis followed by operation.
Conference on congenital dislocation of hip followed by closed reduction and shelf operation.

New England Baptist Hospital

Tuesday, 9 A. M. General surgical clinic, operations and demonstration of cases.

Wednesday, 9 A. M. Surgical operations.
2 P. M. Gastro-enterological clinic.

Thursday, 9 A. M. General surgical clinic, operations and demonstration of cases.

Boston Lying-in Hospital

Tuesday, 9 A. M. Dry Clinics.
Heart disease in pregnancy.
Treatment of pregnancy complicated by heart disease.
End-results in pre-eclamptic toxaemia.
Treatment of pre-eclamptic toxaemia by removal of blood plasma and reinfusion of corpuscles.
Clinical aspects of pyelitis in pregnancy.
The postpartum bladder.

Wednesday, Staff, 9 A. M. Obstetrical operations.

Beth Israel Hospital

9 A. M. daily. General surgical clinic.
Demonstration in medical research department.

Boston University School of Medicine
(Evans Memorial Building)

Wednesday and Friday, 2 P. M. Studies in sterility. Endocrinology.

Tufts College Medical School

2 P. M. daily. Demonstration of specimens illustrating results of traumatism, especially cranial and cerebral.

Massachusetts Eye and Ear Infirmary

Tuesday—Ophthalmology and Otolaryngology.
9 A. M. Operations and demonstrations of cases.
Wednesday, 9 A. M. Staff. Ophthalmology operations and demonstrations of cases.
Thursday, 9 A. M. Ophthalmology. Staff. Operations and demonstrations of cases.
Friday—Opthalmology.
Friday, 9 A. M. Otolaryngology. Dry clinic.

Children's Hospital

Tuesday, 9 A. M. Dry clinic.
10:00 Nose and throat operations.
Wednesday, 9 A. M. Sinus thrombosis and thoughts on postoperative healing in acute mastoiditis.
10:00 Nose and throat operations.
Thursday, 9 A. M. Dry clinic.
10:00 Nose and throat operations.

Carney Hospital

Tuesday, 9 A. M. Eye operations and demonstration of cases.
Wednesday, 9 A. M. Eye operations and demonstration of cases.
Thursday, 9 A. M. Eye operations and demonstration of cases.
Friday, 2 P. M. Otolaryngological clinic.

Massachusetts Homeopathic Hospital

Tuesday, 9 A. M. Eye clinic.
Aural clinic.
Thursday, 9 A. M. Eye clinic.
Nose and throat clinic.
Friday, 9 A. M. Eye clinic.

Boston Dispensary

Tuesday, 2 P. M. Beck-Schenk snare methods of tonsillectomy.
Wednesday, 10 A. M. Eye clinic, deemonstration of cases, external diseases, perimetry, ophthalmological co-operation with syphilis clinic.
Thursday, 10 A. M. Ocular lues.

St. Elizabeth's Hospital

Tuesday, 9 A. M. Mastoid and tonsil cases.
Wednesday, 9 A. M. Enucleation of the eye.
Tonsillectomy.
Friday, 9 A. M. Frontal sinus operation.
Mastoid operation.
2 P. M. End-results in radical sinus operations.

Cambridge Hospital

Thursday, 9 A. M. Nose and throat clinic.

New England Hospital for Women and Children

Tuesday and Wednesday, 9 A. M. Ear, nose, and throat clinic; operations and demonstrations of cases.

Beth Israel Hospital

9 A. M. daily. Nose and throat clinic.
Friday, 9 A. M. Eye clinic.

Boston City Hospital

9 A. M. daily. Eye clinic.

Carney Hospital

9 A. M. daily. Eye clinic.

Taken as a whole these exercises cover the various fields of surgery and amount to a thorough postgraduate course.

Boston is to be congratulated in the honor of being the host to the largest surgical organization in the world.

CORRESPONDENCE

THE DISTRIBUTION OF PASTEUR ANTI-RABIC MATERIAL

The Commonwealth of Massachusetts
Department of Public Health
State House, Boston

September 25, 1928.

Editor, NEW ENGLAND JOURNAL OF MEDICINE,

I read with interest in a recent issue of the JOURNAL a letter from Dr. Henry A. Christian urging us to obtain necessary authority and funds for the free distribution of the Pasteur anti-rabic material in the State. From time to time we have given this matter considerable thought, particularly during the recent increased prevalence of the disease and more especially since reading Dr. Christian's letter. There are two reasons why we think the procedure suggested by Dr. Christian would be unsound:

(1) It would seem to us that the public funds at our disposal for biologic products should be spent primarily for distributing those products which tend toward the control of the disease and are therefore of general public interest. These include, of course, such immunizing materials as vaccine virus, toxin-antitoxin, and typhoid vaccine. These also include, it seems to us, such therapeutic products as diptheria and scarlet fever antitoxins since they tend to render the case non-communicable at the earliest possible moment. Although not a biological product, the distribution of arsenicals can be rationalized in the same way. So far as I know, in this State rabies has not been reported as spread by the bite of human beings. Therefore, the Pasteur prophylactic material is of benefit in preventing the disease in the individual exposed but has no influence on its spread through the rest of the community.

(2) Oceans of Pasteur prophylactic material will not solve the disgraceful rabies situation in which the State finds itself today. As has been repeated ad nauseam, this can be accomplished only in this community through control of dogs. One very intelligent local health officer told me that to date his community had spent in the current year $1100 for prophylactic inoculations in exposed individuals and that he wished the amount was ten times as large since through increase in local taxes the fatuous sentimentality which prevents effective action against dogs might be overcome. It may be argued that if our first reason holds it is as unsound to spend the people's money for this material through the local board of health as through a State department. On the other hand, local expenditures are likely to pinch the taxpayer quicker than State expenditures, and in all these matters in which we are interested apparently pressure on the pocketbook is more effective than pressure on the intelligence.

As we have repeatedly pointed out, there is no excuse for the least delay in administering the Pasteur prophylaxis because of the economic status of the exposed individual. Section 95 of Chapter 111 of the General Laws says the local board of health "*shall immediately* provide * * * necessaries * * * for the safety of the inhabitants". In an emergency the effective board of health on being informed of a dog bite in which there is any question

of delay because of cost of the material, orders the material. It then has infinite leisure and legal authority to collect from the individual who is able to pay or from any other community in which the individual may be proved to be a resident. If, however, local boards refuse to do this it seems that under our form of government the citizens in the last analysis are responsible for perpetuating official futility.

Yours truly,

GEORGE H. BIGELOW, M.D.,
Commissioner of Public Health.

RECENT DEATHS

FERRIS—DR. ANNA JACKSON FERRIS, a graduate of the Woman's Medical College of Pennsylvania, Philadelphia, in 1874, a pioneer woman physician of Meriden, Connecticut, died at Monson, Massachusetts, September 24, 1928, at the age of 81. Miss Jackson, a native of North Brookfield, Massachusetts, soon after the Civil War married Adam Ferris of Monson, a veteran of the war. She served as resident physician at the New England Hospital for Women and Children, Roxbury, Mass., for five terms and settled in practice at Meriden, where she continued until obliged by the infirmities of age to retire.

PADDOCK—DR. WILLIAM LE ROY PADDOCK of Pittsfield, a retired Fellow of the Massachusetts Medical Society, died at Dalton, September 25, 1928, aged 78.

He was born in Hamilton, N. Y., in 1850, was educated at Colgate University, where he received an A.B. in 1873, and at the College of Physicians and Surgeons, Columbia, taking his M.D. in 1876. He had practised at Lanesborough, Dalton and Pittsfield, his name being placed on the retired list of the Massachusetts Medical Society in 1916. He was treasurer of the Berkshire District Medical Society from 1890 to 1909 and for 30 years was assistant medical director of the Berkshire Life Insurance Company.

He is survived by his widow, Elizabeth Crane Paddock, a daughter of the late James Brewer Crane of Dalton, and by one daughter.

NEWS ITEMS

DR. LOCKE TO ADDRESS NEW YORK ACADEMY OF MEDICINE—Dr. Edwin Allen Locke will read a paper on the subject Osteomalacia and Paget's Disease before the Section on Surgery of the New York Academy of Medicine, October 5, at 8:30 P. M.

THE APPOINTMENT OF DR. CLIFTON B. LEECH AS CARDIAC FELLOW AT JOHNS HOPKINS HOSPITAL—Dr. Leech has been granted leave of absence from the Cardiac service at the Union and Fall River General Hospitals and will do clinical and laboratory research with Dr. Carter, the cardiologist at the Johns Hopkins Hospital. His duties begin October 1 and will extend up to July 1, 1929.

THE DEFEAT OF AN OPPONENT TO PUBLIC HEALTH MEASURES—At the recent primaries, Wyatt E. Wheeler, candidate for representative, State Legislature, chiropractor, and active lobbyist against compulsory vaccination against smallpox, and similar health measures, and advocate of separate boards of examiners for chiropractors,—was decisively defeated at the polls in the sixth district in Springfield by Mrs. Emma E. Brigham, a graduate nurse and wife of a physician.

This well executed bit of *preventive* medicine was brought about largely through the efforts of the Springfield physicians. More power to them.

EXAMINATION OF PASSENGERS AT SEA—Secretary of Labor James J. Davis, who has recently returned from Europe, favors a plan whereby an immigration inspector, a customs officer and a United States Public Health Service physician would be placed on the large ocean liners to eliminate the hurry and confusion between quarantine and docking. Under this plan incoming aliens would be examined at sea, instead of after arriving in port.

NOTICES

ETHER DAY

The Massachusetts General Hospital will celebrate the eighty-second anniversary of Ether Day on October 12, 1928.

11 A. M.—Ether Dome, Bulfinch Building. Presentation of a bust of Dr. William T. G. Morton by the Associated Anaesthetists of the United States and Canada, and the International Research Society.

11:30 A. M.—Auditorium, Moseley Memorial Building. Address by Graham Lusk, A.M., Ph.D., Sc.D., LL.D., F.R.S., Edinburgh, Professor of Physiology at the Cornell University Medical College, New York.

OFFICERS' WINTER TRAINING COURSE

The Winter Training Course for Officers of the Medical Section, Organized Reserves, U. S. Army, in Boston and vicinity, will open with a dinner on October 10, 1928, at 7:30 P. M., at the University Club, 40 Trinity Place, Boston, Mass.

Officers attending the meeting will be given credit for participation in Military Activities.

REPORTS AND NOTICES OF MEETINGS

MONTHLY MEETING OF THE BERKSHIRE DISTRICT MEDICAL SOCIETY

The monthly meeting of the Berkshire District Medical Society was held the evening of September 17th. Dr. Walter C. Alvarez of the Mayo Clinic was the speaker. He chose for his subject, "Constipation". He gave us a very interesting talk which was well received. The paper was discussed by Dr. Brace W. Paddock.

The next meeting will be held Sunday evening, October 7th. Dr. George W. Crile will speak on "Factors which Control the End Results of Operations on the Gall-Bladder and Thyroid Gland". The paper will be discussed by Dr. Thomas Ordway of Albany, N. Y., and Dr. Thomas P. Hennelly of Pittsfield. Dr. Willis C. Campbell of Memphis, Tennessee, will give an address on, "The Onlay Graft in Un-

united Fractures". Discussion will be opened by Dr. George S. Reynolds of Pittsfield. Dr. Emil Novak of Johns Hopkins Hospital will lecture on, "The Differential Diagnosis of Menopausal and Post-Menopausal Hemorrhage". Discussion will be by Dr. M. Criscitiello of Pittsfield.

H. J. DOWNEY, *Secretary.*

HAMPSHIRE DISTRICT MEDICAL SOCIETY

For the regular September meeting, Hampshire District joined with the other three western Massachusetts districts in a meeting at the Belchertown state school where we were the guests of the Trustees and Dr. George E. McPherson. After a delightful luncheon Dr. McPherson conducted a clinic and presented many interesting cases. Then the Fellows were shown about the institution and shown what was being accomplished in physiotherapy.

The December meeting of Hampshire District will be addressed by Dr. Philemon Truesdale of Fall River on the twelfth.

The March, 1929, meeting will be addressed by Dr. George Edward Gage, Professor of Bacteriology and Physiology at the Massachusetts State College, on the thirteenth.

L. O. WHITMAN,
Secretary Hampshire District.

NEW ENGLAND WOMEN'S MEDICAL SOCIETY

The New England Women's Medical Society will give a dinner to the Women Members of the American College of Surgeons on Wednesday, October 10, 1928, at the Hotel Vendome, Boston, Mass., at 6 P. M.

SOCIETY MEETINGS

October 1-12—The Graduate Fortnight of the New York Academy of Medicine. For complete notice see page 396, issue of August 23.

October 8-12—Clinical Congress of the American College of Surgeons. For complete notice see page 695, this issue.

October 8-13—Clinical Congress of Physical Therapy and Seventh Annual Meeting American College of Physical Therapy. Complete notice appears on page 545, issue of September 13.

October 12-19—Inter-state Postgraduate Medical Association of North America. Detailed notice appears on page 589, issue of September 20.

October 23-24—The autumn meeting of the State Nurses' Association. For complete notice see page 649, issue of September 27.

November 9-10—New England Surgical Society, Tenth Meeting. Complete notice appears on page 542, issue of September 13.

December 3-7—Radiological Society Convention. Detailed notice appears on page 712, issue of May 17.

DISTRICT MEDICAL SOCIETIES

Barnstable District Medical Society

Schedule of Meetings: November 1, 1928, February 7, 1929, May 2, 1929.

Berkshire District Medical Society

The especial features of the October meeting will be addresses by Dr. George Crile of Cleveland, Dr. Emil Novak of Johns Hopkins, Dr. Willis Campbell of Memphis, Tennessee, and Dr. Thomas Ordway of Albany, N. Y.

Bristol North District Medical Society

April 18, 1929—Spring meeting.

Bristol South District Medical Society

Meetings will be held November 7, 1928, and May 2, 1929. Complete notices will appear later.

Essex North District Medical Society

October 17, 1928 (Wednesday afternoon), at 2 P. M.—A joint meeting with Middlesex East and North, and Essex South will be held at Essex Sanatorium at Middleton. (Telephone Danvers 300-W.)

November 1, 1928 (Thursday)—Censors meet at Hotel Bartlett, 95 Main Street, Haverhill (Tel. 3430), at 2 P. M.

January 2, 1929 (Wednesday)—Semi-annual meeting at Haverhill, at 12:30 P. M.

May 1, 1929 (Wednesday)—Annual meeting at Lawrence, at 12:30 P. M.

May 2, 1929 (Thursday)—Censors meet at Hotel Bartlett, 95 Main Street, Haverhill, at 2 P. M. (Tel. 3430.)

Essex South District Medical Society

October 17, 1928 (Wednesday)—Essex Sanatorium, Middleton. Joint meeting with Essex North and Middlesex East and West. Clinic at 5 P. M. Buffet supper at 7 P. M. Speaker: Dr. Edwin C. Bullock of Boston. Subject: Resuscitation from Electric Shock, Inhalation of Illuminating Gas, and Immersion in Water.

November 1, 1928 (Thursday)—Censors meet for examination of candidates at Salem Hospital at 3:30 P. M. Candidates should apply to the Secretary (Dr. R. E. Stone, Beverly) at least one week prior.

November 7, 1928 (Wednesday)—Salem Hospital. Clinic at 5 P. M. Dinner at 7 P. M. Speaker: Dr. Harry Solomon, Boston. Subject: Syphilis of the Nervous System. Discussion by Drs. W. V. McDermott of Salem and C. A. Bonner of Hathorne (10 minutes each). Discussion from the floor.

Further announcements will follow.

Franklin District Medical Society

Meeting will be held on the second Tuesday of November, January, March and May.

Middlesex East District Medical Society

The following schedule of meetings has been arranged for the coming year:

October 17—Middleton. (Joint meeting with Essex North and South and Middlesex North.)
November 14—Woburn.
January 16—Wakefield.
March—Reading.
May—Melrose.

Subjects and speakers to be arranged by committees in each city or town.

Middlesex North Medical Society

October 17—A combined meeting with Essex North and South.

The winter meeting will be held the last Wednesday in January.

The annual meeting will be held the last Wednesday in April.

Middlesex South District Medical Society

March 27, 1929—Joint meeting with the Suffolk and Norfolk Districts.

April, 1929—Annual meeting. Definite date to be announced later.

Norfolk District Medical Society

Below are the proposed meetings of the Norfolk District Medical Society for the 1928-29 Season. The schedule below will be adhered to as strictly as possible. The carrying out of the proposed plan will, of course, depend upon the acceptances of invitations extended to the speakers. Minor changes may be necessary.

October 30—Pondville Hospital. Dr. Lyman F. Jones, Superintendent. Inspection, 4 P. M.; Business Meeting at 5:30; Papers by the Staff; Collation.

November 21—Boston Medical Library. In combination with Suffolk District and Middlesex South District Societies. Subject, Recent Advances in Physical Therapy. Dr. Frederick W. O'Brien and Dr. Edwin T. Wyman.

January 29—Roxbury Masonic Temple. Subject, Treatment of Varicose Veins by the Injection Method—Dr. E. E. O'Neil. Dr. Homans will open the discussion.

February 25—Roxbury Masonic Temple. Dr. W. R. Ohler. Subject to be announced. Discussion to be opened by Dr. A. A. Hornor.

March 29—Roxbury Masonic Temple. Subject and speakers to be announced.

May, 1929—Annual meeting program to be announced.

The Censors of the Society meet November 8, 1928, and May 9, 1929, at the Roxbury Masonic Temple, Warren Street, Roxbury, at 4 P. M., for the examination of candidates.

Worcester North District Medical Society

October 23, 1928 (Tuesday)—At Gardner State Colony, by invitation. Program by Staff Colony.

January 22, 1929 (Tuesday)—At Henry Heywood Memorial Hospital, Gardner, by invitation. Program by Staff.

Annual meeting the fourth Tuesday in April.